Reference Guide

HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Command Line Interface

Product Version: 8.8-1

Third Edition (March 2005)

Part Number: EK-G80CL-RA. C01

This guide provides detailed descriptions of all HP StorageWorks Array Controller Software (ACS) Command Line Interface (CLI) commands and instructions on how to use each command.

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Command Line Interface
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about this guide

This reference guide:

- Lists all of the available HP StorageWorks HSG60 and HSG80 Array Controller Software Command Line Interface (CLI) commands.
- Explains how to use available CLI commands.
- Provides supplemental information about each CLI command.

This “About this Guide” sections covers the following topics:

Overview

This section covers the following topics:

- Intended audience
- Prerequisites
- Related documentation

Intended audience

This book is intended for administrators who are experienced with the following:

- HP StorageWorks HSG60 and HSG80 Array Controllers
- HP StorageWorks Array Controller Software (ACS), V8.7*x-x*
- HP StorageWorks BA370 enclosure and enclosure components, such as cache modules, external cache batteries, and so forth
- HP StorageWorks M2100 or M2200 enclosure and enclosure components, such as cache modules, external cache batteries, and so forth

Prerequisites

Before you complete procedures in this document, observe the items below:

- Thoroughly review and observe the requirements and precautions described in the "CLI Command Introduction" chapter that starts on page 39.
- Know what version and variant of ACS is currently in use.
- Know which enclosure model is currently in use.
- Know whether the subsystem controllers are in a single or dual-redundant configuration.
- Familiarize yourself with the subsystem configuration details.
- Know the model and types of components installed in your HP StorageWorks BA370, M2100, or M2200 enclosure.

Related documentation

Other documentation relative to HSG60 and HSG80 hardware, software, and firmware is listed in Table 1. To acquire up-to-date information regarding the HSG60 and HSG80 array controllers or ACS, visit the following HP website:

http://h18006.www1.hp.com/products/storageworks/acs/index.html

Table 1: Related Documentation

Item	Document Name	Document Part Number
1.	*Compaq StorageWorks Modular Array Configuration Guide*	EK-MACON-CA
2.	*HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide*	EK-G80TS-SA. C01
3.	*HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*	EK-G80MS-RA. C01
4.	*HP StorageWorks Replacing a Gigabit Link Module (GLM) in an HSG60 or HSG80 Array Controller Installation Instructions*	EK-80GLM-TE. D01
5.	*HP StorageWorks Replacing DIMMs in an HSG60 or HSG80 Cache Module Installation Instructions*	EK-80DIM-IM. E01
6.	*HP StorageWorks Replacing an HSG60 or HSG80 Cache Module Installation Instructions*	EK-80CAH-IM. F01
7.	*HP StorageWorks Replacing an HSG60 or HSG80 Array Controller Installation Instructions*	EK-80CTL-IM. F01
8.	*HP StorageWorks Replacing an External Cache Battery (ECB) Installation Instructions*	EK-80ECB-IM. F01
9.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for HP-UX Installation and Configuration Guide*	AA-RV1FA-TE
10.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for HP-UX Release Notes*	AA-RV1GA-TE
11.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for IBM AIX Installation and Configuration Guide*	AA-RV1HA-TE
12.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for IBM AIX Release Notes*	AA-RV1JA-TE
13.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for Linux X86 and Alpha Release Notes*	AA-RV1KA-TE

Table 1: Related Documentation (Continued)

Item	Document Name	Document Part Number
14.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for LINUX X86 and Alpha Installation and Configuration Guide*	AA-RV1LA-TE
15.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for Novell NetWare Installation and Configuration Guide*	AA- RV1MA -TE
16.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for Novell NetWare Release Notes*	AA- RV1NA -TE
17.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for OpenVMS Installation and Configuration Guide*	AA- RV1PA -TE
18.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for OpenVMS Release Notes*	AA- RV1QA -TE
19.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for Sun Solaris Installation and Configuration Guide*	AA- RV1RA -TE
20.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for Sun Solaris Release Notes*	AA- RV1SA -TE
21.	*HP StorageWorks Command Console Version 2.4 Release Notes*	AV- RV1TA -TE
22.	*HP StorageWorks Command Console Version 2.4 User Guide*	AA- RV1UA -TE
23.	*HP StorageWorks Command Console Version 2.4 Online Help* (HSG60 and HSG80)	AA-RS20A-TE AA-RS21A-TE
24.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for Tru64 UNIX Installation and Configuration Guide*	AA- RV1VA -TE
25.	*HP StorageWorks HSG80 Enterprise/Modular Storage RAID Array Fibre Channel Solution Software Version 8.8 for Tru64 UNIX Release Notes*	AA- RV1WA -TE
26.	*Compaq StorageWorks 64-Bit PCI-to-Fibre Channel Host Bus Adapter User Guide*	AA-RKPDB-TE
27.	*Digital StorageWorks UltraSCSI RAID Enclosure (DS-BA370-Series) User's Guide*	EK-BA370-UG. B01
28.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for Windows Installation and Configuration Guide*	AA- RV1XA -TE

Table 1: Related Documentation (Continued)

Item	Document Name	Document Part Number
29.	*HP StorageWorks HSG80 ACS Solution Software Version 8.8 for Windows Release Notes*	AA-RV1YA-TE
30.	*HP StorageWorks Enterprise/Modular Storage RAID Array Fibre Channel Arbitrated Loop Configurations Application Note*	AA-RS1ZB-TE
31.	*HP StorageWorks Enterprise/Modular Storage RAID Array Fibre Channel Arbitrated Loop Configurations for Novell Netware Application Note*	AA-RVHHA-TE
32.	*HP StorageWorks Addendum for ACS Solution Software - Differences Between HSG60 and HSG80 Array Controllers*	AV-RV2MA-TE

Conventions

Conventions consist of the following:

- Document conventions
- Text symbols
- Equipment symbols

Document conventions

This document follows the conventions in Table 2.

Table 2: Document Conventions

Convention	Element
Blue text: Figure 1	Cross-reference links
Bold	Menu items, buttons, and key, tab, and box names
Italics	Text emphasis and document titles in body text
`Monospace font`	User input, commands, code, file and directory names, and system responses (output and messages)
`Monospace, italic font`	Command-line and code variables
Blue underlined sans serif font text (http://www.hp.com)	Website addresses

Text symbols

The following symbols may be found in the text of this guide. They have the following meanings:

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.

Caution: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

Tip: Text in a tip provides additional help to readers by providing nonessential or optional techniques, procedures, or shortcuts.

Note: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Equipment symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings:

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

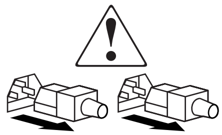
WARNING: To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of personal injury from a hot component, allow the surface to cool before touching.



Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Rack stability

Rack stability protects personnel and equipment.

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- In single rack installations, the stabilizing feet are attached to the rack.
- In multiple rack installations, the racks are coupled.
- Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.

Getting help

If you still have a question after reading this guide, contact an HP authorized service provider or access our website: http://www.hp.com.

HP technical support

Telephone numbers for worldwide technical support are listed on the following HP website: http://www.hp.com/support/. From this website, select the country of origin.

Note: For continuous quality improvement, calls may be recorded or monitored.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

HP storage website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at: http://www.hp.com/country/us/eng/prodserv/storage.html. From this website, select the appropriate product or solution.

HP authorized reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518
- Elsewhere, visit http://www.hp.com and click Contact HP to find locations and telephone numbers.

CLI Command Introduction

1

This chapter provides a general description of the Command Line Interface (CLI) and details how to use CLI commands. HP StorageWorks Array Controller Software (ACS), Version 8.8-*x*, uses predefined commands to maintain controller parameters and manage storagesets. Topics include:

The "CLI Command Descriptions" chapter, which starts on page 51, contains a description of each CLI command with the correct syntax and examples of usage, as well as supplemental information.

CLI overview

Issuing CLI commands through the maintenance port of the controller is the most direct means of communicating with the controller. CLI commands allow you to manage the subsystem by viewing and modifying the configuration of the controller, and the devices attached to them. You can also use the CLI to start controller diagnostic and utility programs.

While the CLI provides the most detailed level of subsystem control, the HP StorageWorks Command Console (SWCC) application is an alternative application for using CLI commands. The HP SWCC replicates most of the functions available within the CLI in graphic form and provides a user-friendly method of executing CLI commands.

Using the CLI

Access the CLI through the following methods:

- Connecting a personal computer (PC) or local terminal to the maintenance port on the front of the controller.
- Using the *Diagnostic Utility Protocol (DUP)* utility from a system terminal, enable a remote connection to the controller. After the controller is initially configured and made visible to the host, other configuration tasks can be performed through this remote connection.
- Using the SWCC by way of a PC setup on the subsystem. SWCC can be used to perform most of the CLI commands that the local terminal can perform.

Command overview

CLI commands are divided into categories based on the options or structures they control. The following subsections list these command categories.

Array controller commands

Array controller commands configure the maintenance terminal characteristics, CLI prompt, and so forth. These commands are also used to shut down and restart the controller. Controller commands consist of general and failover commands.

The CLI commands that pertain to the controllers in a general way are:

- `CLEAR_ERRORS CLI`
- `CLEAR_ERRORS` *`controller`* `INVALID_CACHE`

- `CONFIGURATION RESET`
- `CONFIGURATION RESTORE`
- `CONFIGURATION SAVE`
- `EXIT`
- `HELP`
- `POWEROFF`
- `RESTART` *`controller`*
- `RUN`
- `SELFTEST`
- `SET` *`controller`*
- `SET DISABLE_MANAGERS`
- `SET ENABLE_MANAGERS`
- `SHOW` *`controller`*
- `SHOW ID`
- `SHOW MANAGERS`
- `SHUTDOWN` *`controller`*
- `WWID_ASSIGN` *`storageset`* `LUN_WWID=`

The CLI commands controlling the Failover mode of a controller pair are:

- `SET FAILOVER` *`COPY=controller`*
- `SET MULTIBUS_FAILOVER`
- `SET NOFAILOVER`
- `SET NOMULTIBUS_FAILOVER`

Device commands

Device commands create and configure containers made from physical devices attached to the controller. Device commands consist of general and spareset, or failedset commands. The CLI commands that allow you to add and configure physical devices in general are:

- `ADD DISKS`
- `ADD PASSTHROUGH`
- `CLEAR_ERRORS` *`device-name`* `UNKNOWN`

- `INITIALIZE`
- `LOCATE`
- `RENAME`
- `SET` *`device-name`*
- `SET EMU`
- `SHOW DEVICES`
- `SHOW DISKS`
- `SHOW` *`disk-name`*
- `SHOW EMU`
- `SHOW PASSTHROUGH`

The CLI commands that support sparesets and failedsets include:

- `ADD SPARESETS`
- `DELETE FAILEDSETS`
- `DELETE SPARESETS`
- `SET FAILEDSET`
- `SHOW FAILEDSETS`
- `SHOW SPARESETS`

Selective storage presentation commands

Selective storage presentation commands enable or disable access to individually selected units from host and controller ports. Paths can be enabled or disabled, either all inclusively or specifically on a per-path basis during the addition of new units or as a modification of existing units.

Tip: Refer to the *HP StorageWorks HSG Element Manager User Guide* for additional details on selective management options.

The CLI commands that pertain to the selective storage presentation feature include:

- `ADD CONNECTIONS`
- `ADD UNITS`

- `CLEAR_ERRORS` *`unit-number`* `LOST_DATA`
- `CLEAR_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`
- `DELETE` *`connection-name`*
- `DELETE` *`unit-number`*
- `RETRY_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`
- `SET` *`connection-name`*
- `SET` *`unit-number`*
- `SHOW` *`connection-name`*
- `SHOW CONNECTIONS`
- `SHOW` *`unit-number`*

Storageset commands

Storageset commands create and configure complex containers made from groups of device containers. These commands group device containers together and allow them to be handled as single units. There are four types of storagesets:

- Stripesets
- RAIDsets
- Striped Mirrorsets
- Mirrorsets

The CLI commands that pertain to storagesets include:

- `ADD MIRRORSETS`
- `ADD RAIDSETS`
- `ADD STRIPESETS`
- `DELETE` *`container-name`*
- `INITIALIZE`
- `LOCATE`
- `MIRROR`
- `REDUCE`
- `REINITIALIZE` *`container-name`*
- `RENAME`
- `SET` *`mirrorset-name`*

- `SET` *`RAIDset-name`*
- `SHOW` *`mirrorset-name`*
- `SHOW MIRRORSETS`
- `SHOW` *`raidset-name`*
- `SHOW RAIDSETS`
- `SHOW STORAGESETS`
- `SHOW` *`stripeset-name`*
- `SHOW STRIPESETS`
- `UNMIRROR`
- `WWID_ASSIGN` *`storageset`* `LUN_WWID=`

Partition commands

Partition commands create multiple logical disk units from the same container. The CLI commands that pertain to partitions include:

- `CREATE_PARTITION`
- `DESTROY_PARTITION`

Logical unit commands

Logical unit commands create and optimize access to logical units made from any container type. The CLI commands that pertain to logical units include:

- `ADD CONCATSETS`
- `ADD SNAPSHOT_UNITS`
- `DELETE` *`concatset-name`*
- `LOCATE`
- `RENAME`
- `RETRY_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`
- `SET` *`concatset-name`*
- `SHOW` *`concatset-name`*
- `SHOW CONCATSETS`

Diagnostic and utility commands

Diagnostic and utility commands perform general controller support functions. The commands that pertain to the diagnostics and utilities include:

- `DIRECTORY`
- `RUN`
- `SHOW ELEVATION_INFO`

HP StorageWorks Data Replication Manager commands

HP StorageWorks Data Replication Manager (DRM) uses the peer-to-peer remote copy function of the HP StorageWorks HSG80 Array Controller to achieve data replication. HSG80 Array Controller pairs at the initiator site are connected to a partner HSG80 Array Controller pair at the target site. Remote copy sets are created from units at the initiator and target sites. These remote copy sets are mirrors of each other.

HSG80 Array Controllers provide failover and failback capabilities in case of failures. Failover makes the data available at the target site after a failure. Failback is used to move data operations back to the initiator site after the site is back online.

Note: All DRM commands are hidden and inoperative until the controller pair is put into Remote Copy mode by specifying the *`REMOTE_COPY`* switch of the `SHOW controller` command (see page 256).

DRM applies only to HSG80 Array Controllers running ACS V8.8-*x*P.

The CLI commands used to configure a DRM environment, and for failover and failback procedures include:

- `ADD ASSOCIATIONS`
- `ADD REMOTE_COPY_SETS`
- `ADD SNAPSHOT_UNITS`
- `DELETE` *`association-set-name`*
- `DELETE` *`remote-copy-set-name`*
- `SET` *`association-set-name`*
- `SET` *`remote-copy-set-name`*
- `SHOW ASSOCIATIONS`

- `SHOW` *`association-set-name`*
- `SHOW REMOTE_COPY_SETS`
- `SHOW` *`remote-copy-set-name`*
- `SITE_FAILOVER`

Getting help

To get help with using the CLI commands, enter `HELP` at the CLI prompt. The resulting display shows an overview of the CLI Help System. To obtain help with a specific command or to determine which switches are available with a command, enter as much of the command syntax that is known, followed by a space and a question mark.

For example, to get information on the switches used with the `SET` *`THIS_CONTROLLER`* command, enter:

```
SET THIS_CONTROLLER=?
```

To see what is allowed for a prompt, enter the following:

```
SET THIS PROMPT=?
```

Entering CLI commands

Use the following tips and techniques for entering CLI commands:

- Commands are *not* case-sensitive.
- For most commands, only enter enough of the command to make the command unique. For example, `SHO` is the same as entering `SHOW`.
- The controller processes each command in sequence, regardless of the number of commands entered. A controller experiencing heavy data I/O might respond slowly to CLI commands.

Specific keys or a combination of keys allow the ability to recall and edit the last four commands. This feature can save time and help prevent mistakes if you are entering similar commands during the configuration process. Table 3 on page 47 lists the keys used to recall and edit commands.

Table 3: Recall and Edit Command Keys

Keystroke	Description
Up Arrow or **Ctrl+B**, **Down Arrow** or **Ctrl+N**	Steps forward or backward through the four most recent CLI commands.
Left Arrow or **Ctrl+D**, **Right Arrow** or **Ctrl+F**	Moves the cursor left or right in a command line.
Ctrl+E	Moves the cursor to the end of the line.
Ctrl+H	Moves the cursor to the beginning of the line.
Ctrl+J or **Linefeed** key	Deletes the word to the left of the cursor.
Ctrl+U	Deletes all characters on the same line as the cursor.
Ctrl+A or **F14**	Toggles between Insert and Overstrike mode: ■ The default setting is Insert mode allowing you to insert characters at the cursor location (moving the existing characters to the right). ■ Overstrike mode replaces existing characters. The CLI prompt returns to Insert mode at the beginning of each line.
Ctrl+R	Recalls the contents of the command line. This function is especially helpful if the system issues a message that interrupts your typing.

Command syntax

Each CLI command is described using the following structure:

COMMAND <PARAMETER_NAME=*parameter*> *SWITCHES*

- COMMAND—A word or phrase expressed as a verb used to instruct the controller what to do. Commands are represented in this guide in capitalized form.
- PARAMETER_NAME—The name of a parameter, followed by an equal sign and the parameter variable. If a specific command specifies parameter names, they must be entered in the command string. Parameter names are represented in this guide in capitalized form.

- *parameter*—If required in the command, parameters use one or more words or phrases that supply necessary information to support the action of the COMMAND. Note that not all CLI commands require parameters. Parameters are represented in this guide as lowercase, italicized text.
- *SWITCHES*—An optional word or phrase that modifies the command or a parameter string. Not all CLI commands require switches. Switches are represented in this guide as capitalized, italicized text.

Note: All commands in this guide use courier typeface font.

Changing the CLI prompt

Change the CLI prompt display by using the `SET` *`controller PROMPT`* command. Enter a 1- to 16-character string as the new prompt. For example, the prompt could be changed as follows:

HSG80_TOP>	To indicate the controller type and which controller (top or bottom)
PROD_HSG_TOP>	To indicate the controller use (production), and which controller (top or bottom)
HSG34_TOP>	To indicate the which one of many HSG controllers and which controller (top or bottom)

CLI Command Descriptions

2

This chapter contains the descriptions of the available CLI commands used with the ACS V8.8-*x*F, V8.8-*x*G, V8.8-*x*L, V8.8-*x*P, and V8.8-*x*S software. Each command is described using the following format:

- Command name and brief description
- Syntax needed to enable command
- Parameters needed (if any) to further specify the command
- Switches needed (if any) to modify the command
- Examples to illustrate the command usage
- *See Also* sections to cross-reference to others with similar usage

ADD ASSOCIATIONS

An association set is a group of remote copy sets that shares common attributes (See `SET` *`association-set-name`* for the attribute list). This command adds an association set to the pair of controllers. The association set can be initialized with a single remote copy set through the use of the `SET` *`remote-copy-set-name`* command. Additional remote copy sets can be added to the association set with the `SET` *`association-set-name`* command.

Note: This command is hidden and inoperative until the controller pair is put into Remote Copy mode by specifying the *`REMOTE_COPY`* switch of the `SET` *`controller`* command.

This command is valid only on the node on which the Initiator resides (where remote copy sets are configured).

This command is rejected if the specified remote copy set is unknown to the controller pair.

Syntax

`ADD ASSOCIATIONS` *`association-set-name remote-copy-set-name`*

Parameters

The following parameter is *required* for the `ADD ASSOCIATIONS` command:

association-set-name

Identifies the name of the association set. The *`association-set-name`* can consist of a maximum of nine printable characters, excluding commas and backslashes.

Note: Association sets cannot be renamed with the `RENAME` command. If the wrong name is entered, the association set must be deleted and then added again.

Switches

The following switch supports the `ADD ASSOCIATIONS` command:

remote-copy-set-name

The name of the first member of the association set.

Examples

To create an association set, AS3, from remote copy sets RSC1 and RSC2, enter:

```
ADD ASSOCIATIONS AS3 RSC1
SET AS3 ADD=RSC2
```

See Also

`ADD REMOTE_COPY_SETS`
`SHOW ASSOCIATIONS`
`SET` *`association-set-name`*

ADD CONCATSETS

Creates a specialized volume, called a *concatset* or *concatenation set*, from a storageset that was given a unit number. Another storageset can then be added to the concatset by using the `SET concatset-name` command, and thereby, dynamically increasing the size of the unit.

Caution: This command can only be executed with host operating systems that support dynamic volume expansion. If the operating system cannot handle one of its disks increasing in size, use of this command could make data inaccessible.

Syntax

`ADD CONCATSETS concatset-name storageset-name`

Parameters

The following parameters are *required* for the `ADD CONCATSETS` command:

- *concatset-name*
- *storageset-name*

These parameters are described in the following paragraphs.

concatset-name

Identifies the name to be assigned to the concatenation set or concatset. The *concatset-name* must consist of a string of up to nine printable characters excluding commas and backslashes.

storageset-name

Designates the first storageset to be a member of the concatset. The storageset specified must already be configured as a unit.

Switches

There are no switches associated with this command.

Examples

To convert unit D0, which consists of stripeset STRIPE1, to a concatset, enter:

```
ADD CONCATSETS C1 STRIPE1
```

To add STRIPE2 to the concatset C1, enter:

```
SET C1 ADD=STRIPE2
```

See Also

DELETE *concatset-name*
SET *concatset-name*
SHOW CONCATSETS
SHOW *concatset-name*

ADD CONNECTIONS

Adds the specified host connection to the table of known connections. Each path between a Fibre Channel adapter in a host computer and an active host port on a controller is a connection. The connections table is maintained in controller memory. The maximum number of connections allowed on the connection table is 96. If the table contains 96 entries, new connections cannot be added until old ones are deleted. If you exceed the maximum number of host connections, ACS notifies you of the discrepancy, issues instance code, 43036A64, and rejects your request to add a new connection.

There are two mechanisms for adding a new connection to the table:

- Physically connecting a host adapter to a controller host port. During Fibre Channel initialization, the controller is aware of the connection and adds it to the table. The controller assigns a default connection name to new connections that are discovered through the physical connection. The default connection name is of the form `!NEWCON`*`nn`*.

Note: Certain host conditions, such as a power cycle, that disturb the state of the switched fabric can cause a connection to reappear in the table. The connection is assigned a default connection name.

- Adding a connection through the `ADD CONNECTIONS` command.

Note: The `ADD CONNECTIONS` command adds an entry to the table whether the connection physically exists or not. The table can be completely filled with fictitious connections.

Syntax

```
ADD CONNECTIONS connection-name HOST_ID=host-id
   ADAPTER_ID=adapter-id CONTROLLER=controller
   PORT=port
```

```
ADD CONNECTIONS REJECTED_HOST=index
```

Parameters

The following parameters support the `ADD CONNECTIONS` command:

- *connection-name*
- *HOST_ID*
- *ADAPTER_ID*
- *CONTROLLER*
- *PORT*
- *REJECTED_HOST*

These parameters are described in the following paragraphs.

connection-name

Identifies the name assigned to the host connection. The *connection-name* can consist of a maximum of nine printable characters excluding brackets, commas, and backslashes.

The controller automatically assigns a default connection name if a connection is physically made between a host adapter and a controller port. The form of a default connection name is `!NEWCON`*nn*.

HOST_ID=host-id

Identifies the World Wide Name (WWN) of the host. The WWN is a 16-character hexadecimal number. The hyphens are not necessary but are recommended to avoid mistakes in entering the number. The host ID parameter name must be entered, followed by an equal sign, and then followed by the WWN of the host.

For example, to specify a WWN of AAAA-BBBB-CCCC-DDDD, enter:

```
HOST_ID=AAAA-BBBB-CCCC-DDDD
```

ADAPTER_ID=adapter-id

Identifies the WWN of the host Fibre Channel adapter. The WWN is a 16-character hexadecimal number. The hyphens are not necessary but are recommended to avoid mistakes in entering the number. The adapter ID parameter name must be entered, followed by an equal sign, and then followed by the WWN of the host bus adapter.

For example, to specify a WWN of WWN of AAAA-BBBB-CCCC-DDDD, enter:

```
ADAPTER_ID=AAAA-BBBB-CCCC-DDDD
```

Note: The WWN of the host and adapter are sometimes the same. This is a characteristic of the adapter.

CONTROLLER=controller

Specifies which controller the host is to connect through. The *CONTROLLER* parameter is the name for the *controller* variable. The choices are THIS_CONTROLLER and OTHER_CONTROLLER.

PORT=port

Specifies which host port (1 or 2) the connection is on. *PORT* is the parameter name for the *port* variable.

REJECTED_HOST=rejected-host-index

Adds a !NEWCON*nn* connection to the connection table in an Offline state. The host must issue a FC PLOGI to make the connection active. There are mechanisms to do this in UNIX and OpenVMS but not Microsoft® Windows® NT® (except during a reboot).

To manually add rejected host zero, issue the following command:

```
ADD CONNECTION REJECTED_HOST=0
```

Note: Use SHOW CONNECTIONS *FULL* to display the rejected host connections.

To force the connection into an Online state, issue the following two commands:

```
CLI> SET <THIS | OTHER> PORT_<1|2>_TOPOLOGY = OFFLINE
CLI> SET <THIS | OTHER> PORT_<1|2>_TOPOLOGY = FABRIC
```

The above command forces all hosts connected to that controller or port to log in again. Additionally, hosts connected to the controller pair through the same switch (regardless of controller or port) log in again as well.

Caution: Turning the port off and then on is better than rebooting the system, since pinging the fabric name server would result in all hosts re-logging in (up to 96).

After the connection is added, it gets deleted from the reject list. Index numbers for remaining rejected hosts are re-ordered.

Switches

The following switches support the `ADD CONNECTION` command:

- *`OPERATING_SYSTEM`*
- *`RESERVATION_STYLE`*
- *`UNIT_OFFSET`*

These switches are described in the following paragraphs.

OPERATING_SYSTEM=OS_name

Specifies the operating system of the host. The *`OS_name`* switch is used to tailor controller behavior for use with a particular operating system. Refer to your operating system specific operating system (OS) solution software kit to determine which value should be used. The following values are supported:

- HP
- IBM
- NETWARE
- SGI
- SNI
- SUN
- TRU64_UNIX
- VMS
- WINNT
- AIX_CAMBEX
- HP_VSA

RESERVATION_STYLE=CONNECTION_BASED *(default)* ***RESERVATION_STYLE=HBA_PORT_ID_BASED***

Selection of a *RESERVATION_STYLE* should be based upon the capabilities of the host operating system. Refer to the OS solution kit for more details. SCSI persistent reservations are processed differently by HSG60 and HSG80 array controllers based upon the *RESERVATION_STYLE*. Normal SCSI reservations (not persistent) are always treated as *CONNECTION_BASED*.

- Specify *HBA_PORT_ID_BASED* to propagate a single persistent reservation command to all HSG80 array controller ports; thereby, enabling the host to access the unit over any available path.
- Specify *CONNNECTION_BASED* to make the persistent reservation valid for the port on which it is received; thereby, limiting the host access to those paths that are explicitly reserved.

Note: If a particular host prefers either the *CONNECTION_BASED* or *HBA_PORT_ID_BASED* reservation style, all the connections to that particular host must have identical reservation style settings.

The most important advantage of this mechanism is that it allows various hosts, with different reservation style requirements, to be connected to the same array controllers in a storage area network (SAN) environment.

UNIT_OFFSET=n

Specifies the decimal value (*n*) that establishes the beginning of the range of units that a host connection can access. This offset defines and restricts host connection access to a contiguous group of unit numbers.

Note: Setting unit offsets requires a Windows NT 4.0 host reboot (reboot -r) for the newly set offsets to take effect. Windows 2000 and Windows Server 2003 require a disk rescan.

In Transparent Failover mode, host connections on port 1 default to an offset of 0; port 1 connections can see units 0 through 99. Host connections on port 2 default to an offset of 100; port 2 connections can see units 100 through 199.

In Multiple-bus Failover mode, the default offset is 0 for all host connections.

Note: If a controller pair is switched from Transparent Failover mode to Multiple-bus Failover mode, the unit offsets for Transparent Failover mode remain in effect.

The LUN number equals the unit number minus the offset:

LUN number = unit number – offset

- Logical unit number or LUN number = the logical unit number presented to the host connection.
- Unit number = the number assigned to the unit in the `ADD UNITS` command. This is the number by which the unit is known internally to the controllers.

For example, a system has three host connections, each of which can see 8 LUNs. Each connection designates its LUNs as 0 through 7. To define for each of these connections a block of 8 units, set the offset for each connection, as follows:

```
CLI>SET SERVER1 UNIT_OFFSET=0
CLI>SET SERVER2 UNIT_OFFSET=10
CLI>SET SERVER3 UNIT_OFFSET=120
```

Note: It is not necessary to use offsets that are divisible by 10, but it makes things simpler.

The effects of these offset assignments are as follows:

- Server1 accesses units D0 through D7, which it sees as LUNs 0 through 7.
- Server2 accesses units D10 through D17, which it sees as LUNs 0 through 7.
- Server3 accesses units D120 through D127, which it sees as LUNs 0 through 7.

If you are assigning unit numbers and offsets consider the following. If the *`SCSI_VERSION`* switch of the `SET THIS CONTROLLER` or `SET OTHER CONTROLLER` command is set to SCSI-3, the command console LUN (CCL) is presented as LUN 0 to every connection, superseding any unit assignments. For more information, see the `ADD UNITS` command.

Examples

This example shows how to add an entry for a connection named George to the table of known connections, with the indicated host and adapter WWNs, on port 2 of “this controller” and with reservations checked using the port ID of the host bus adapter.

```
ADD CONNECTIONS GEORGE HOST_ID=1000-0000-C920-1234
ADAPTER_ID=1000-0000-C920-5678 CONTROLLER=THIS PORT=2
RESERVATION_STYLE=HBA_PORT_ID_BASED
```

See Also

DELETE *connection-name*
SET *connection-name*
RENAME
SHOW *connection-name*
SHOW CONNECTIONS

ADD DISKS

Names a disk drive and adds it to the controller configuration. This command is typically used if disk drives are added to a previously configured subsystem. During initial setup, the entire disk set is customarily added to the controller configuration by issuing the `RUN` command for the *CONFIG* utility.

Note: The controller supports a maximum of 84 physical storage devices (excluding those in BA370 enclosures), even though more than 84 target IDs are available. Do not exceed the maximum number of physical devices in the subsystem. BA370 enclosures support up to 72 physical devices.

Note: Before adding new disk drives to a subsystem that presents units to host systems that use Microsoft Windows operating systems, you must add the disk to the array and then issue the `INITIALIZE` *`container-name`* command with the *`DESTROY_MBR`* switch for all new disks drives. This action eliminates the MBR block that is factory-written on new disk drives before they are shipped from HP. Failure to destroy the MBR block of new factory-shipped disks can cause a Windows host system to create two partitions: an 8 MB partitioned drive and a physical drive.

Syntax

`ADD DISKS` *`disk-name scsi-port-target-lun`*

Parameters

The following parameters are *required* for the `ADD DISKS` command:

- *`disk-name`*
- *`scsi-port-target-lun`*

These parameters are described in the following paragraphs.

disk-name

Assigns a name to the disk device. This *`disk-name`* can then be used with the `ADD UNITS` command to create a logical unit, or a parameter in the adding of a storageset.

The `disk-name` can consist of a maximum of nine printable characters, excluding commas and backslashes.

A disk drive is commonly named DISK*pttll*, where *pttll* is the disk port-target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of disk drive and the disk drive SCSI location.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place at least one space between the port number, target number, and LUN number if you are entering the PTL address.

- *port*—Designates the SCSI device port number, from 1 to 6, on which the disk resides.
- *target*—Designates the SCSI target ID of the disk on the port. Valid device target IDs for single controller configurations are 00–15, excluding ID 7. Valid device target IDs for dual controller configurations are 00–15, excluding IDs 6 and 7.
- *lun*—Indicates the LUN of the disk drive and is always zero.

The parameters *port*, *target*, and *lun* must be entered with at least one space between them. Leading zeroes can be excluded.

Switches

The following switches support the ADD DISKS command:

- *TRANSFER_RATE_REQUESTED=*
- *TRANSPORTABLE and NOTRANSPORTABLE*

These switches are described in the following paragraphs.

TRANSFER_RATE_REQUESTED=

Specifies the maximum data transfer rate at which the controller is to communicate with the disk drive. The transfer rate might need to be limited to accommodate long cables between the controllers and the device. Transfer rate options include the following:

- *ASYNCHRONOUS*
- *DEFAULT*

- *20MHZ (default)*
- *10MHZ*
- *5MHZ*

TRANSPORTABLE
NOTRANSPORTABLE *(default)*

Indicates whether a disk drive can be accessed exclusively by HSG60 or HSG80 controllers or can be used by non-HP StorageWorks systems:

- Specify *TRANSPORTABLE* to allow disk drives to be moved to non HP StorageWorks environments while keeping data intact. Disk drives do not contain any metadata or restricted areas. Therefore, transportable disks forfeit the advantage metadata provides. Disks that are to be used in storagesets cannot be set as transportable.
- Specify *NOTRANSPORTABLE* to allow disk drives to be moved to only HP StorageWorks environments. The controller makes a small portion of the disk inaccessible to the host. This restricted space is used to store administrative information (metadata) used to improve data reliability, error detection, and the ability to recover data.

If you specify the *NOTRANSPORTABLE* switch and there is no metadata on the unit, the unit must be initialized. If you specify *TRANSPORTABLE* for a disk that was originally initialized as a *NOTRANSPORTABLE*, you should initialize the disk.

Note: HP recommends that you avoid using transportable disks unless there is no other way to move the data.

Examples

To add DISK10000 at port 1, target 0, LUN 0, enter:

```
ADD DISKS DISK10000 1 0 0
```

To add DISK40200 as a transportable disk drive to port 4, target 2, LUN 0, enter:

```
ADD DISKS DISK40200 4 2 0 TRANSPORTABLE
```

To add a disk drive named DISK30200 as a non-transportable disk to port 3, target 2, LUN 0 and set the data transfer rate to 10 MHz, enter the following on one line:

```
ADD DISKS DISK30200 3 2 0 NOTRANSPORTABLE
TRANSFER_RATE_REQUESTED=10MHZ
```

To create a host-addressable unit after the disk is added, enter:

```
INITIALIZE DISK40200
```

```
ADD UNITS D199 DISK40200
```

See Also

ADD PASSTHROUGH
ADD UNITS
DELETE *container-name*
INITIALIZE
LOCATE
SET *mirrorset-name*
SET *device-name*
SET *RAIDset-name*
SHOW DISKS
SHOW DEVICES
SHOW PASSTHROUGH

ADD MIRRORSETS

Names a mirrorset and adds it to the controller configuration. Mirrorsets are often referred to as *RAID 1* storagesets. The data capacity of a RAID 1 is determined by the storage size of the smallest member (base member size). You can have up to 6 physical disks drives per RAID 1 storagesets.

Syntax

`ADD MIRRORSETS` *`mirrorset-name disk-name1 [disk-nameN]`*

Parameters

The following parameters are *required* for the `ADD MIRRORSETS` command:

- *`mirrorset-name`*
- *`disk-name1`*

These parameters are described in the following paragraphs.

mirrorset-name

Assigns a name to the mirrorset container.

Note: This is the name used with the `ADD UNITS` command to identify the mirrorset as a host-addressable unit.

The mirrorset name can consist of a maximum of nine printable characters, excluding commas and backslashes.

A mirrorset is commonly named `MIRR`*`n`*, where *`n`* is a sequentially assigned, unique identifier. Other naming conventions are acceptable, but this naming convention presents both the type of container and a unique identifier for the container in an intuitive manner.

disk-name1 [disk-nameN]

Identifies the disk drives making up the mirrorset. A mirrorset can contain one to six disk drives.

Switches

The following switches support the ADD MIRRORSETS command:

- *COPY*
- *POLICY* and *NOPOLICY*
- *READ_SOURCE*

These switches are described in the following paragraphs.

COPY=FAST
COPY=NORMAL (default)

Sets the speed at which the controller copies data to a new member from normal mirrorset members:

- Specify *COPY=FAST* to allow the creation of mirrored data to take precedence over other controller operations. If you specify *COPY=FAST*, the controller uses more resources to create the mirrored data and copying takes less time; however, overall controller performance is reduced.
- Specify *COPY=NORMAL* if operations performed by the controller should take priority over the copy operation. If you specify *COPY=NORMAL*, creating the mirrored data has a minimal impact on controller performance.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement disk from the spareset if a mirrorset member fails.

- Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the mirrorset was initialized). If there is more than one disk drive in the spareset that meets the criteria, the controller selects a disk drive with the best performance.
- Specify *POLICY=BEST_PERFORMANCE* to allow the software to choose a replacement disk drive from the spareset with the best performance. The controller attempts to select a disk on a different port than existing mirrorset members. If more than one disk drive in the spareset matches the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size.

- Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. The mirrorset operates in a Reduced state until a *POLICY=BEST_FIT* or *POLICY=BEST_PERFORMANCE* is selected or a member is manually placed in the mirrorset (see SET *mirrorset-name* on page 216).

READ_SOURCE=LEAST_BUSY (default)
READ_SOURCE=ROUND_ROBIN

Selects the mirrorset member used by the controller to satisfy a read request.

- Specify *READ_SOURCE=LEAST_BUSY* to direct read requests to the mirrorset disk with the least amount of work in its queue. If multiple disks have equally short queues, the controller queries normal disks for each read request as it would if *READ_SOURCE=ROUND_ROBIN* is specified.
- Specify *READ_SOURCE=ROUND_ROBIN* to sequentially direct read requests to each local mirrorset disk. The controller equally queries all normal disks for each read request.

Examples

To create a mirrorset named MIRR1 consisting of disks DISK10000, DISK20100, and DISK30200, enter:

```
ADD MIRRORSETS MIRR1 DISK10000 DISK20100 DISK30200
```

To create a host-addressable unit after the mirrorset MIRR1 was created, enter:

```
INITIALIZE MIRR1
ADD UNITS D104 MIRR1
```

See Also

ADD DISKS
ADD UNITS
DELETE *container-name*
INITIALIZE
MIRROR
REDUCE
SHOW *mirrorset-name*
SHOW MIRRORSETS
SHOW STORAGESETS
UNMIRROR

ADD PASSTHROUGH

Names a passthrough device and adds it to the controller configuration. This command is typically used if passthrough devices are added to a previously configured subsystem. During initial setup, the entire device set is customarily added to the controller configuration through the *CONFIG* utility.

Note: HP StorageWorks EMA series cabinets support a maximum of 84 physical storage devices, even though more than 84 target IDs are available. HP StorageWorks BA370 and RA8000 series enclosures and cabinets support a maximum of 72 physical storage devices. Do not exceed the maximum number of physical devices in the subsystem.

Syntax

`ADD PASSTHROUGH` *`passthrough-name scsi-port-target-lun`*

Parameters

The following parameters are *required* for the `ADD PASSTHROUGH` command:

- *`passthrough-name`*
- *`scsi-port-target-lun`*

These parameters are described in the following paragraphs.

passthrough-name

Assigns a name to the passthrough device. This container name is then used with the `ADD UNITS` command to create a logical unit.

The passthrough name can consist of a maximum of nine printable characters excluding commas and backslashes.

A passthrough device is commonly named *`PASSpttll`*, where *`pttll`* is the disk port-target-LUN address. Although other naming conventions are acceptable, this naming convention presents the type of passthrough device and the passthrough device SCSI location.

scsi-port-target-lun

Indicates the SCSI device PTL address. Place at least one space between the port number, target number, and the LUN number after entering the PTL address.

- `port`—Designates the SCSI device port number, from 1 to 6, on which the passthrough device resides.
- `target`—Designates the SCSI target ID of the passthrough device on the port. Valid device target IDs for single controller configurations are 00–15, excluding ID 7. Valid device target IDs for dual controller configurations are 00–15, excluding IDs 6 through 7.
- `lun`—Indicates the LUN of the passthrough device.

The parameters `port`, `target`, and `lun` must be entered with at least one space between them. Leading zeroes can be excluded.

Switches

The following switch supports the `ADD PASSTHROUGH` command:

- *TRANSFER_RATE_REQUESTED*

TRANSFER_RATE_REQUESTED

Specifies the maximum data transfer rate at which the controller is to communicate with the passthrough device. The transfer rate might need to be limited to accommodate long cables between the controllers and the device. Valid values are listed below:

- *TRANSFER_RATE_REQUESTED=ASYNCHRONOUS*
- *TRANSFER_RATE_REQUESTED=DEFAULT*
- *TRANSFER_RATE_REQUESTED=20MHZ* *(default)*
- *TRANSFER_RATE_REQUESTED=10MHZ*
- *TRANSFER_RATE_REQUESTED=5MHZ*

Examples

To add PASS10200 at port 1, target 2, LUN 0, enter:

```
ADD PASSTHROUGH PASS10200 1 2 0
ADD UNIT P4 PASS10200
```

See Also

`ADD UNITS`
`DELETE` *`container-name`*
`LOCATE`
`SET` *`mirrorset-name`*
`SET` *`device-name`*
`SET` *`RAIDset-name`*
`SHOW DISKS`
`SHOW DEVICES`
`SHOW PASSTHROUGH`

ADD RAIDSETS

Names a RAIDset and adds the RAIDset to the controller configuration.

Note: The maximum size of a RAIDset is 1.024 TB.

The maximum configuration rule for RAIDsets are as follows:

- 20 RAID 3/5 storagesets
- 30 RAID 3/5 and RAID 1 storagesets[1]
- 45 RAID 3/5, RAID 1, and RAID 0 storagesets[1]
- 6 physical disk drives per RAID 1 storageset (mirrorset)
- 14 physical disk drives per RAID 3/5 storageset (RAIDset)
- 24 physical disk drives per RAID 0 storageset (stripeset)
- 48 physical disk drives per RAID 0+1 storageset (striped mirrorset)

RAIDsets are RAID level 3/5 storagesets that use the best characteristics of RAID level 3 and RAID level 5. A RAIDset should contain only disk drives of the same capacity. The controller limits the effective capacity of each member to the capacity of the smallest member in the storageset (base member size) after the storageset is initialized. Thus, if you combine 9 GB disk drives with 4 GB disk drives in the same storageset, you waste 5 GB of capacity on each 9 GB member. A RAIDset must include at least 3 disk drives, but no more than 14.

Syntax

`ADD RAIDSETS` *`RAIDset-name disk-name1 disk-name2`*
`disk-name3 [disk-nameN]`

Parameters

The following parameters support the `ADD RAIDSETS` command:

- *`RAIDset-name`*
- *`disk-name`*

---

1. This is a combined maximum that is limited to no more than 20 RAID 3/5 storagesets in the individual combination.

These parameters are described in the following paragraphs.

RAIDset-name

Assigns a name to the RAIDset. This is the name used with the `ADD UNITS` command to identify the RAIDset as a host-addressable unit.

The *`RAIDset-name`* can consist of a maximum of nine printable characters excluding commas and backslashes.

It is common to name a RAIDset `RAIDn`, where *`n`* is a sequentially assigned, unique identifier. This naming convention presents the user with the type of container and its unique identifier.

disk-name1 disk-name2 disk-name3 [disk-nameN]

Identifies the disks making up the RAIDset.

Switches

The following switches support the `ADD RAIDSETS` command:

- *`POLICY and NOPOLICY`*
- *`RECONSTRUCT`*
- *`REDUCED and NOREDUCED`*

These switches are described in the following paragraphs.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement member from the spareset after a RAIDset member fails:

- Specify *`POLICY=BEST_FIT`* to choose a replacement disk drive from the spareset that equals or exceeds the base member size of the remaining members of the RAIDset. If more than one disk drive in the spareset is the correct size, the controller selects a disk drive giving the best performance.
- Specify *`POLICY=BEST_PERFORMANCE`* to choose a replacement disk drive from the spareset resulting in the best performance of the RAIDset. The controller attempts to select a disk on a different port than existing

RAIDset members. If there is more than one disk drive in the spareset matching the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size of the RAIDset.

- Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. This RAIDset operates in a Reduced state until you select either *POLICY=BEST_PERFORMANCE* or *POLICY=BEST_FIT*, or manually place a member in the RAIDset. See SET *RAIDset-name* for more information regarding this procedure.

RECONSTRUCT=FAST
RECONSTRUCT=NORMAL (default)

Sets the speed at which the controller reconstructs data to a new RAIDset disk that replaces the failed disk:

- Specify *FAST* to allow the reconstruct process to take precedence over other controller operations. If the *RECONSTRUCT=FAST* switch is specified, the controller uses more resources to perform the reconstruction. Reconstruction takes less time, but overall controller performance is reduced during reconstruction.
- Specify *NORMAL* to balance other controller operations with the reconstruct operation. The controller uses relatively few resources to perform the reconstruct process, and there is little impact on controller performance.

REDUCED
NOREDUCED (default)

Permits the addition of a RAIDset that is missing a member (due to a failure):

- Specify *REDUCED* if you add a reduced RAIDset (a RAIDset that is missing one member).

Note: Verify that the RAIDset contains all but one of its disks before specifying the *REDUCED* switch.

- Specify *NOREDUCED* if all the disks making up the RAIDset are present—for instance, while creating a new RAIDset.

Examples

To create a RAIDset named RAID9 that contains disks DISK10000, DISK20100, and DISK30200, enter:

```
ADD RAIDSETS RAID9 DISK10000 DISK20100 DISK30200
```

To create a RAIDset named RAID8 that contains disks DISK10000, DISK20100, and DISK30200, and uses the *BEST_FIT* switch to indicate the replacement policy, enter:

```
ADD RAIDSETS RAID8 DISK10000 DISK20100 DISK30200 POLICY=BEST_FIT
```

Note: Enter the `ADD RAIDSETS` command on one line.

To create a RAIDset named RAID8 that contains disks DISK10000, DISK20100, and DISK30200, then initialize it and make it into a host-addressable unit, enter:

```
ADD RAIDSETS RAID8 DISK10000 DISK20100 DISK30200
INITIALIZE RAID8
ADD UNITS D70 RAID8
```

To create a three-member RAIDset from the members of a reduced four-member RAIDset, enter the following (do not initialize the RAIDset again):

```
ADD RAIDSETS RAID6 DISK10300 DISK20400 DISK30200 REDUCED
```

Caution: Data contained on the RAIDset is erased if you reinitialize the RAIDset.

Note: If you move a RAIDset from one controller to another, and the RAIDset becomes reduced during the move, you cannot use the *REDUCED* switch to recreate the RAIDset. To recreate the RAIDset, you must:

1. Create a new RAIDset with the remaining original members.
2. Add a new disk (that is newly initialized) to complete the number of members in the original set *without* using the *REDUCED* switch.
3. Observe that the system recognizes the newly added disk as not part of the original RAIDset and moves it to the failedset.
4. Move the new disk from the failedset, and place it into the active RAIDset.

Refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide* for additional details.

See Also

ADD UNITS
DELETE *container-name*
INITIALIZE
SHOW RAIDSETS
SHOW RAIDSETS
SHOW *raidset-name*
SHOW STORAGESETS

ADD REMOTE_COPY_SETS

Creates a remote copy set (RCS) consisting of one unit at the initiator site and one unit at the target site. The units can be a single disk (JBOD) or a stripeset, mirrorset, or RAIDset.

Note: This command works only in a DRM environment and requires an HSG80 array controller with ACS V8.8-*x*P. Like all DRM commands, use of this command is heavily restricted. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for examples of usage.

This command can only be used on the initiator (local) site.

The following restrictions apply to remote copy sets:

- There is a maximum of 12 remote copy sets per initiator and target pair.
- Neither initiator nor target units can be transportable units, concatset units, or snapshot units.

Syntax

`ADD REMOTE_COPY_SETS` *`remote-copy-set-name`*
`initiator-unit-name` *`remote-node-name\target-unit-name`*

Parameters

The following parameters are *required* for the `ADD REMOTE_COPY_SETS` command:

- *`remote-copy-set-name`*
- *`initiator-unit-name`*
- *`remote-node-name\target-unit-name`* (this parameter is *not* required; it can be added later through the `SET` command)

These parameters are described in the following paragraphs.

remote-copy-set-name

Identifies the name by which the remote copy set is known. This name must be unique across the fabric.

Note: Remote copy sets cannot be renamed with the `RENAME` command. If the wrong name is entered, the remote copy set must be deleted and then added again.

The remote copy set name can consist of a maximum of nine characters excluding commas and backslashes.

initiator-unit-name

Identifies the name of the initiator unit that is to be the first member of the remote copy set. This unit cannot be involved in a snapshot, and must not be a concatset.

remote-node-name \ target-unit-name

The *`remote-node-name`* part of the parameter specifies the name of the controller pair—called a *node*—receiving the command. The *`target-unit-name`* part specifies the unit on the remote node to be added as the target of the remote copy set.

Switches

The following switches support the `ADD REMOTE_COPY_SETS` command:

- *`OPERATION_MODE`*
- *`OUTSTANDING_IOS`*

These switches are described in the following paragraphs.

OPERATION_MODE=SYNCHRONOUS (default) *OPERATION_MODE=ASYNCHRONOUS*

Determines which of two normal operating modes is assigned to the remote copy set.

- Specify *`SYNCHRONOUS`* to assure data consistency at all times among the members of a remote copy set. If you specify *`SYNCHRONOUS`*, write operations must be completed on the remote units of the remote copy set before the host is informed that the operation is complete. Synchronous operation assures data consistency at all times among the members of a remote copy set.

- Specify *ASYNCHRONOUS* to report the write operation as complete to the host before the data is written to the remote units of the remote copy set. Asynchronous mode gives greater performance and faster response time, but the data on all members of the remote copy set cannot be assumed to be always the same.

OUTSTANDING_IOS=n *(1 to 240; default is 200)*

Sets the number of outstanding I/O operations from the initiator to the target. The way this switch operates depends on which operating mode is set by the *OPERATION_MODE* switch:

- In Synchronous mode, *OUTSTANDING_IO* refers to the number of remote writes (write operations from the initiator to the target) that can be outstanding.
- In Asynchronous mode, *OUTSTANDING_IO* refers to the number of write operations that can be reported as completed to the host before they are written on all the members of the remote copy set.

Example

To create remote copy set RCS1, consisting of unit D1 on the local controller pair and unit D21 on a remote controller pair (node) named London, enter:

```
ADD REMOTE_COPY_SETS RCS1 D1 LONDON\D21
```

See Also

ADD ASSOCIATIONS
SET *controller* and *REMOTE_COPY=node-name NOREMOTE_COPY*
SET *remote-copy-set-name*

ADD SNAPSHOT_UNITS

Creates and names a snapshot unit. A snapshot unit is one that reflects the contents of another unit at a particular point in time (the instant the `ADD SNAPSHOT_UNITS` command is entered). The snapshot unit can be manually presented to the host. The snapshot unit remains until it is deleted (`DELETE` command).

Note: To use this command, 512 MB of cache memory must be available.

Note: This command is operational only in ACS Versions 8.8-*x*S and 8.8-*x*P, and only if both controllers have mirrored cache.

Note: The presentation of dynamic disk snapshots and snapclones, and HSG80 features, to Windows 2000 platforms to which a source LUN is present is not supported in Windows 2000.

Syntax

`ADD SNAPSHOT_UNITS` *`snapshot-unit storageset-name source-unit`*

Parameters

The following parameters are *required* for the `ADD SNAPSHOT_UNITS` command:

- *`snapshot-unit`*
- *`storageset-name`*
- *`source-unit`*

The relationship of the parameters can be summarized as follows:

If the `ADD SNAPSHOT_UNITS` command is entered, *`storageset-name`* becomes *`snapshot-unit`* and archives the current contents of *`source-unit`* at that instant.

These parameters are described in the following paragraphs.

snapshot-unit

Identifies the unit number assigned to the snapshot unit (see the `ADD UNITS` command for an explanation of unit numbers).

The snapshot unit is created with all host access disabled by default. Issue a `SET` *`unit-name`* `ENABLE` command to set up host access.

The snapshot unit is created on the same controller as the source unit and always remains online to the same controller as the source unit.

storageset-name

Identifies the name of the storageset that becomes the snapshot unit. The storageset must have the following characteristics:

- Capacity equal to or greater than the source unit
- Initialized
- Not a partition or a concatset

source-unit

Identifies the unit whose contents are frozen in time and preserved on the snapshot unit. The source unit must have the following characteristics:

- Less than 1.024 TB
- Writeback cache enabled
- Non-transportable
- Must be preferred to one controller or the other (see the *`PREFERRED_PATH`* switch of the `SET` *`unit-number`* command).

Switches

The following switch supports the ADD SNAPSHOT_UNITS command:

USE_PARENT_WWID

Causes the snapshot unit to be created with a special World Wide ID (WWID) derived from that of the parent or source unit. If the special WWID for the specified source unit is in use, then a new WWID is automatically allocated, and a warning message is displayed.

Note: The *USE_PARENT_WWID* switch limits the number of WWIDs that an operating system needs to track. This can become an issue if snapshots are created and subsequently deleted from the same source or parent unit on a regular basis.

Example

To create unit D4, which consists of storageset RAID4 and which becomes a snapshot of unit D1, enter:

```
ADD SNAPSHOT_UNITS D4 RAID4 D1
```

See Also

SET *unit-number*
DELETE *container-name*
SHOW *unit-number*

ADD SPARESETS

Adds a disk drive to the spareset and initializes the metadata on the drive. The spareset is a pool of drives available to the controller to replace failing storageset members.

Syntax

`ADD SPARESETS` *`disk-name`*

Parameters

The following parameter supports the `ADD SPARESETS` command.

disk-name

Indicates the name of the disk drive being added to the spareset. Only one disk drive can be added to the spareset with each `ADD SPARESETS` command.

Switches

There are no switches associated with this command.

Example

To add disk drives named DISK20200 and DISK30300 to a spareset, enter:

```
ADD SPARESETS DISK20200
ADD SPARESETS DISK30300
```

See Also

`DELETE SPARESETS`
`SHOW SPARESETS`
`SHOW STORAGESETS`

ADD STRIPESETS

Names a stripeset and adds it to the controller configuration. A stripeset can contain from 2 to 24 members. Stripesets are also referred to as RAID level 0 storagesets. The number of members in the stripeset is determined by the number of *`container-name`* parameters specified.

Note: The maximum size of a stripeset is 1.024 TB (1,024 GB). The size of a stripeset is approximated by multiplying the size of the smallest member by the number of members in the stripeset.

Syntax

```
ADD STRIPESETS stripeset-name container-name1
container-name2 [container-nameN]
```

Parameters

The following parameters are *required* for the `ADD STRIPESETS` command:

- *`stripeset-name`*
- *`container-name`*

These parameters are described in the following paragraphs.

stripeset-name

Assigns a name to the stripeset. This is the name used with the `ADD UNITS` command to identify the stripeset as a host-addressable unit.

The *`stripeset-name`* can consist of up to nine characters, excluding commas and backslashes.

It is common to name a stripeset `STRIPE`*n*, where *n* is a sequentially assigned, unique identifier. This naming convention presents to the user both the type of container and its unique identifier.

container-name1 container-name2 [container-nameN]

Identifies the members (disk drives or mirrorsets) making up the stripeset. Stripesets can contain between 2 and 24 members.

Note: A 256-character limit exists for the command line. If configuring a stripeset with many members, consider renaming the members to shorter names in order to enter the entire command line.

Switches

There are no switches associated with this command.

Examples

To create a stripeset named STRIPE1 that contains disks DISK10000, DISK20100, and DISK30200, enter:

```
ADD STRIPESETS STRIPE1 DISK10000 DISK20100 DISK30200
```

To create a logical unit from STRIPE1, enter:

```
INITIALIZE STRIPE1
ADD UNITS D103 STRIPE1
```

To create a two-member striped mirrorset (a stripeset whose members are mirrorsets), and a logical unit from it, enter:

```
ADD MIRRORSETS MR1 DISK10000 DISK20100
ADD MIRRORSETS MR2 DISK30200 DISK40300
ADD STRIPESETS STRIPE1 MR1 MR2
INITIALIZE STRIPE1
ADD UNITS D104 STRIPE1
```

Note: Because you can initialize the stripeset, you do not need to individually initialize the mirrorset members.

See Also

`ADD UNITS`
`ADD MIRRORSETS`
`DELETE` *`container-name`*

```
INITIALIZE
SHOW STORAGESETS
SHOW STRIPESETS
SHOW stripeset-name
```

ADD UNITS

Creates a logical unit from a specified container. The controller maps all requests from the host to the logical-unit number as requests to the container specified in the `ADD UNITS` command. Units can be created from all container types:

- Disk and passthrough devices
- Stripesets
- Mirrorsets
- RAIDsets
- Partitions
- Striped mirrorsets

If adding a newly created container to a subsystem, the container must be initialized in order to be added as a logical unit. If adding a container with previously stored data that needs to be maintained, do not initialize this container; the container is added as a logical unit.

Caution: Adding a unit immediately makes that unit available to all host connections unless the *`ENABLE_ACCESS PATH`* switch of the `ADD UNITS` command is specified as disabled.

Syntax

`ADD UNITS` *`unit-number container-name`*

Parameters

The following parameters are *required* for the `ADD UNITS` command:

- *`unit-number`*
- *`container-name`*

These parameters are described in the following paragraphs.

unit-number

Identifies the designation by which the controller keeps track of the unit. This number maps to one or more host-accessible LUNs. Unit numbers are prefixed by *D* and are in the range of 0–199. How units are assigned to ports depends on the Failover mode.

- Transparent Failover mode:
  - D0 to D99 are units assigned to port 1
  - D100 to D199 are units assigned to port 2
  - In Transparent Failover mode, adding unit D1 creates a logical unit and presents it as D1 to the host on port 1. Adding unit D101 creates a logical unit and presents it as D1 to the host on port 2.

Note: If a dual-redundant pair of controllers is in Transparent Failover mode, only one port per controller is active.

- Multiple-bus Failover mode:
  - D0 to D199 are units visible to the hosts through both ports of both controllers
  - In Multiple-bus Failover mode, adding unit D0 creates a logical unit that is presented to both ports on both controllers. What hosts can see the unit is determined by parameters of the `ADD CONNECTIONS` command and by the *`ENABLE_ACCESS_PATH`* or *`DISABLE_ACCESS_PATH`* switch of the `ADD UNITS` command.

  Refer to the detailed description of Failover modes that are contained in the controller installation and configuration guide for further information regarding the relationship between unit numbers and Failover mode.

  All units composed from the partitioning of a storageset must be maintained on the same controller.

  The LUN number a host connection uses to access a unit is a function of the *`UNIT_OFFSET`* switch in the `ADD CONNECTIONS` (or `SET` *`connection-name`*) command. LUN number equals unit number minus offset:

  LUN number = unit number – offset

If no value is specified for the *UNIT_OFFSET* switch in the ADD CONNECTIONS (or SET *connection-name*) command, the offsets are as follows:

— In Transparent Failover mode, host connections on port 1 have an offset of 0 and host connections on port 2 have an offset of 100.

— In Multiple-bus Failover mode, all ports have a default offset of 0.

container-name

Specifies the name of the container (device, storageset, or partition) being used to create the unit. A unit can consist of a maximum of 48 devices.

Switches

Table 4 lists all switches for the ADD UNITS command and identifies which switches can be used with each type of device or storageset. Descriptions of each switch follow the table.

Table 4: ADD UNITS Switches for New Containers

Switch / Container Type	RAIDset	Stripeset	Mirrorset	NOTransportable	Transportable	Passthrough
ENABLE_ACCESS_PATH *DISABLE_ACCESS_PATH*	✓	✓	✓	✓	✓	✓
MAX_READ_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓	
MAX_WRITE_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓	
MAXIMUM_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓	
PARTITION=partition-number	✓	✓	✓	✓		
PREFERRED_PATH *NOPREFERRED_PATH*	✓	✓	✓	✓	✓	✓
READ_CACHE *NOREAD_CACHE*	✓	✓	✓	✓	✓	
READAHEAD_CACHE *NOREADAHEAD_CACHE*	✓	✓	✓	✓	✓	

Table 4: ADD UNITS Switches for New Containers (Continued)

Switch	Container Type	RAIDset	Stripeset	Mirrorset	NOTransportable	Transportable	Passthrough
RUN *NORUN*		✓	✓	✓	✓	✓	
WRITE_PROTECT *NOWRITE_PROTECT*		✓	✓	✓	✓	✓	
WRITEBACK_CACHE *NOWRITEBACK_CACHE*		✓	✓	✓	✓		

Note: The *NORUN* switch cannot be specified for partitioned units.

ENABLE_ACCESS_PATH= *(default)*
DISABLE_ACCESS_PATH=

Determines which host connections can access the unit.

- Specify *ENABLE_ACCESS_PATH=ALL* to permit all host connections to access the unit. This is the default.
- Specify *DISABLE_ACCESS_PATH=ALL* to prevent all host connections from accessing the unit.

The allowable variables are:

- *ALL*
- A string of connection names separated by commas and enclosed in parentheses.

Caution: If the storage subsystem has more than one host connection, the access path must be specified carefully to avoid giving undesirable host connections access to the unit. The default condition is that access paths to all host connections are enabled. To restrict host access to a set of host connections, specify *DISABLE_ACCESS_PATH=ALL* if the unit is added, then use the SET *unit-number* command to specify the set of host connections that are to have access to the unit.

Enabling the access path to a particular host connection does not override previously enabled access paths. All access paths previously enabled are still valid. The new host connection is added to the list of connections that can access the unit.

The procedure of restricting access by enabling all access paths and then disabling selected paths is *not* recommended because of the potential data or security breach that occurs if a new host connection is added.

MAX_READ_CACHED_TRANSFER_SIZE=n
MAX_READ_CACHED_TRANSFER_SIZE=32 (default)

Sets the largest number of read blocks to be cached by the controller. The controller does not cache any transfers over the size set. Acceptable values are 0 through 2,048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and writeback cache if it is set on a controller that has read and writeback caching.

MAX_WRITE_CACHED_TRANSFE_SIZE=n
MAX_WRITE_CACHED_TRANSFER_SIZE=32 (default)

Sets the largest number of write blocks to be cached by the controller. The controller does not cache any transfers over the size set. Acceptable write block sizes are 0 through 2,048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and writeback cache after set on a controller that has read and writeback caching.

MAXIMUM_CACHED_TRANSFER_SIZE=n
MAXIMUM_CACHED_TRANSFER_SIZE=32 (default)

Sets the largest number of read and write blocks to be cached by the controller. The controller does not cache any transfers over the size set. Acceptable block sizes are 0 through 2,048.

The *MAXIMUM_CACHED_TRANSFER_SIZE* switch affects both read and writeback cache if it is set on a controller that has read and writeback caching. The use of this switch has the effect of setting both the *MAX_READ_CACHED_TRANSFER_SIZE* and the *MAX_WRITE_CACHED_TRANSFER_SIZE* switches.

PARTITION=partition-number

Identifies the partition number for a partition on a container. The *partition-number* identifies the partition associated with the unit number being added. Use the SHOW DISKS or SHOW STORAGESETS command to find the partition numbers used by a storageset or a single-disk unit.

Note: Transportable units cannot be partitioned. All partitions on a container must be addressed through the same controller. If you add a unit for a partition and specify the preferred path switch, all partitions on that container inherit the same path.

PREFERRED_PATH=OTHER_CONTROLLER
PREFERRED_PATH=THIS_CONTROLLER
NOPREFERRED_PATH *(default)*

Tells the controller whether or not it is expected to bring a unit online in dual boot situations.

The controllers only use the *PREFERRED_PATH* setting if they are in a dual-redundant configuration. If one controller fails, all the devices are accessed through the remaining controller, ignoring the *PREFERRED_PATH* setting.

You can specify the *PREFERRED_PATH* switch for a single controller configuration; however, the switch does not take effect until you add a second controller and configure the two controllers for dual-redundancy.

Note: If controllers are configured to operate in Transparent Failover mode, do not set the preferred path with the ADD UNITS or SET *unit-number* command—otherwise, an error message is generated. This error message indicates that the assignment of a preferred controller path at the unit level as valid only if operating in Multiple-bus Failover mode.

The following describes how to specify the *PREFERRED_PATH* switch:

- If no preferred path is assigned, the unit is targeted through the controller that detects the unit first after the controllers start.
- Select *PREFERRED_PATH=THIS_CONTROLLER* to instruct “this controller” to bring this unit online.
- Select *PREFERRED_PATH=OTHER_CONTROLLER* to instruct the “other controller” to bring this unit online.

Note: All partitions on a container must be addressed through the same controller. If you set the preferred path for one partition, all partitions on that container inherit the same preferred path setting.

READ_CACHE *(default)*
NOREAD_CACHE

Sets the controller read-cache policy function. If *READ_CACHE* is selected and the controller receives a read request from the host, the following events occur: the controller reads the data from the disk drives, delivers it to the host, and stores the data in its cache module. Subsequent reads for the same data takes the data from cache rather than access the data from disks.

Read caching improves performance in almost all situations. Therefore, HP recommends that you leave its default setting, *READ_CACHE*, enabled. However, under certain conditions, such as when performing a backup, read caching may not be necessary since only a small amount of data is cached. In such instances, it can be beneficial to disable the read cache function and remove the processing overhead associated with caching data.

READAHEAD_CACHE *(default)*
NOREADAHEAD_CACHE

Enables the controller to keep track of read I/Os. If the controller detects sequential read I/Os from the host, it tries to keep ahead of the host by reading the next sequential blocks of data (those the host has not yet requested) and putting the data in cache. This process is sometimes referred to as *prefetching*. The controller can detect multiple sequential I/O requests across multiple units.

Read-ahead caching improves host application performance since the data is read from the controller cache instead of disk. Read-ahead caching is the default for units.

If you are adding a unit that is not expected to get sequential I/O requests, use the `NOREADAHEAD_CACHE` switch for the unit.

RUN *(default)*
NORUN

Controls the unit availability to the host:

- Specify `RUN` to make a unit available to the host.
- Specify `NORUN` to make a unit unavailable to the host and to cause any data in cache to be flushed to one or more drives. `NORUN` spins down all the disks used in the unit. The drives comprising the unit spin down after the data is completely flushed.

Note: Do not specify the `RUN` or `NORUN` switches for partitions.

WRITE_PROTECT
NOWRITE_PROTECT *(default)*

Specifies whether data contained on the selected unit can be overwritten:

- Specify `WRITE_PROTECT` to prevent host write operations to the unit. The controller can still write to a write-protected RAIDset to satisfy a reconstruct pass or to reconstruct a newly replaced member. Additionally, metadata, reconstruct, and copy writes are still allowed to RAIDsets and mirrorsets.
- Specify `NOWRITE_PROTECT` to allow the host to write data to the unit. This allows the controller to overwrite existing data.

WRITEBACK_CACHE
NOWRITEBACK_CACHE

Enables or disables the writeback data caching function of the controller. The controller writeback caching feature improves write performance.

Note: The *NOWRITEBACK_CACHE* switch is the default on transportable disks. The *WRITEBACK_CACHE* switch is the default on *NOTRANSPORTABLE* disks.

- Specify *WRITEBACK_CACHE* for all new RAIDsets, mirrorsets, and units that you want to take advantage of the controller writeback caching feature.
- Specify *NOWRITEBACK_CACHE* for units that you want data from the host to go directly to the specified devices without being cached.

Caution: Although there is built-in redundancy to protect data contained in cache, allowing data to be written to writeback cache can result in the loss of data if the controller fails.

Specifying *NOWRITEBACK_CACHE* enables only write-through caching. In write-through caching, if the controller receives a write request from the host, it places the data in its cache module, writes the data to the disk drives, and then notifies the host if the write operation is complete. This process is called *write-through caching* because the data passes through—and is stored in—the cache memory on its way to the disk drives. Write-through caching is only enabled after writeback caching is disabled, or after the *MAXIMUM_CACHED_TRANSFER_SIZE* switch is set to zero.

Note: The controller can take up to five minutes to flush data contained within the writeback cache if you specify the *NOWRITEBACK_CACHE* switch.

Examples

To create unit D102 from a single disk drive named DISK10000, enter:

```
ADD UNITS D102 DISK10000
```

- If the controller pair is in Transparent Failover mode, this unit is on port 2. It is presented to each host connection as LUN (2 – offset). Offset is a host connection characteristic, specified in the `ADD CONNECTIONS` (or `SET` *connection-name*) command.

- If the controller pair is in Multiple-bus Failover mode, this unit can potentially be seen by all four controller ports. It is presented to each host connection as LUN (2 – offset). Offset is a host connection characteristic, specified in the `ADD CONNECTIONS` (or `SET` *`connection-name`*) command.

To create unit D5 from mirrorset MIRR1, and to let only two host connections (Server1 and Server2) have access to this unit, enter:

```
ADD UNITS D5 MIRR1 DISABLE_ACCESS_PATH=ALL
SET UNITS D5 ENABLE_ACCESS_PATH=(SERVER1,SERVER2)
```

- If the controller pair is in Transparent Failover mode, this unit is on port 1 and is available only to host connections Server1 and Server2. Server1 and Server2 must be connected to host port 1 to access the unit. The unit is presented to each host connection as LUN (5 – offset). Offset is a host connection characteristic, specified in the `ADD CONNECTIONS` (or `SET` *`connection-name`*) command.
- If the controller pair is in Multiple-bus Failover mode, this unit can potentially be seen by all four controller ports but is accessible only by host connections Server1 and Server2. It is presented to each host connection as LUN (5 – offset).

To create unit D7 from a RAIDset named RAID9 and instruct the unit to take advantage of the controller writeback caching feature, enter:

```
ADD RAIDSETS RAID9 DISK10100 DISK20100 DISK30100 DISK40100
INITIALIZE RAID9
ADD UNITS D7 RAID9 WRITEBACK_CACHE
```

See Also

`CREATE_PARTITION`
`DESTROY_PARTITION`
`DELETE` *`unit-number`*
`SET` *`connection-name`*
`SET` *`unit-number`*
`SHOW` *`unit-number`*

CLEAR_ERRORS CLI

Stops the display of current or previous error messages at the CLI prompt. Errors are displayed (even after the error condition is rectified) until the controller is restarted or this command is entered.

Note: This command does not clear the error condition. The command only stops the CLI from displaying the error.

There are three message types:

- General information
- Warning (you may want to examine, but the command is executed)
- Error (command does not execute)

Syntax

```
CLEAR_ERRORS CLI
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To clear any message enter:

```
CLEAR_ERRORS CLI
```

See Also

CLEAR_ERRORS *controller* INVALID_CACHE
CLEAR_ERRORS *device-name* UNKNOWN
CLEAR_ERRORS *unit-number* LOST_DATA
CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

CLEAR_ERRORS *controller* INVALID_CACHE

Clears an invalid cache error and allows the controller and cache to resume operation. If the error is due to a mirrored cache configuration that is incorrect, the controller indicates Mirrored mode status after the error is cleared.

Use this command for the following situations:

- If the controller or cache modules are replaced resulting in mismatched data between the controllers.
- If the controller or cache module is replaced while data is still in cache and not properly flushed with the `SHUTDOWN` *`controller`*, `SET NOFAILOVER`, or `SET NOMULTIBUS_FAILOVER` command first.

Syntax

```
CLEAR_ERRORS controller INVALID_CACHE
data-retention-policy
```

Parameters

The following parameters are *required* for the `CLEAR_ERRORS INVALID_CACHE` command:

- *`controller`*
- *`data-retention-policy`*

These parameters are described in the following paragraphs.

controller

Identifies which controller is to receive the `CLEAR_ERRORS INVALID_CACHE` command. You must specify `THIS_CONTROLLER` (the one connected to the CLI maintenance terminal) or `OTHER_CONTROLLER`.

data-retention-policy

Instructs the controller how to handle writeback cached data:

- Specify *NODESTROY_UNFLUSHED_DATA* to retain the cached data and discard controller information. The controller metadata synchronizes with the cache module data and preserves any unwritten data for eventual flushing to the disk array.

Caution: Because unintentional misuse of this command can cause data loss, both the command and the *DESTROY_UNFLUSHED_DATA* switch or the *NODESTROY_UNFLUSHED_DATA* switch must be entered in their entirety. They cannot be abbreviated.

Specify *NODESTROY_UNFLUSHED_DATA* if:

— The controller module is replaced.

— The controller nonvolatile memory (NVMEM) contents are lost.

Specify *DESTROY_UNFLUSHED_DATA* parameter if used to retain the controller information and discard unwritten cache data in the following situations:

— If the cache module is replaced.

— Any other reason not listed above.

Caution: Specifying the *DESTROY_UNFLUSHED_DATA* parameter destroys data remaining in cache, which can result in data loss.

Switches

There are no switches associated with this command.

Examples

To clear an invalid cache error on “this controller” after replacing a controller module, enter the following command on one line:

```
CLEAR_ERRORS THIS_CONTROLLER INVALID_CACHE
NODESTROY_UNFLUSHED_DATA
```

To clear an invalid cache error on the "other controller" after replacing a cache module, enter the following command on one line:

```
CLEAR_ERRORS OTHER_CONTROLLER INVALID_CACHE
DESTROY_UNFLUSHED_DATA
```

See Also

CLEAR_ERRORS CLI
CLEAR_ERRORS *unit-number* LOST_DATA
CLEAR_ERRORS *device-name* UNKNOWN
CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

CLEAR_ERRORS *device-name* UNKNOWN

Forces the controller to recognize a failed device, regardless of the controller evaluation of the device condition. A device failure can cause the controller to label the device as unknown. After that happens, the controller does not check the device again to see if it was repaired or if the error condition was corrected. You must enter this command so the controller can recognize the device after the cause of the error was corrected.

Syntax

`CLEAR_ERRORS` *`device-name`* `UNKNOWN`

Note: The keyword `UNKNOWN` cannot be abbreviated.

Parameters

The following parameter supports the `CLEAR_ERRORS` *`device-name`* `UNKNOWN` command:

device-name

Identifies the device with the unknown error.

Switches

There are no switches associated with this command.

Example

To force the controller to recognize a previously unknown device named DISK30000, enter:

```
CLEAR_ERRORS DISK30000 UNKNOWN
```

See Also

`CLEAR_ERRORS CLI`
`CLEAR_ERRORS` *`controller`* `INVALID_CACHE`
`CLEAR_ERRORS` *`unit-number`* `LOST_DATA`
`CLEAR_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`

CLEAR_ERRORS *unit-number* LOST_DATA

Clears lost data errors on a unit. All partitions on the unit container are affected. The controller reports a lost data error on the unit after you remove a writeback cache module or anytime the cache module contains unflushed data, possibly due to an interruption in the primary power source with no backup power present. This command does not recover the lost data.

Note: Clearing lost data errors or lost data block errors on a RAIDset causes a reconstruction of all parity blocks. Clearing lost data errors or lost data block errors on a mirrorset causes members to Normalize.

Syntax

`CLEAR_ERRORS` *`unit-number`* `LOST_DATA`

Note: The keyword `LOST_DATA` cannot be abbreviated.

Caution: If prompted to issue this command, data loss has occurred.

Parameters

The following parameter supports the `CLEAR_ERRORS LOST_DATA` command.

unit-number

Identifies the unit number on which the lost data error is to be cleared. The *`unit-number`* is the same name given to the unit at the time you added it to controller configurations with the `ADD UNITS` command.

Switches

There are no switches associated with this command.

Example

To clear the lost data error on disk unit number D103, enter:

```
CLEAR_ERRORS D103 LOST_DATA
```

See Also

CLEAR_ERRORS CLI
CLEAR_ERRORS *controller* INVALID_CACHE
CLEAR_ERRORS *device-name* UNKNOWN
CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

CLEAR_ERRORS *unit-number* UNWRITEABLE_DATA

Clears an unwriteable data error on a unit. This command affects all partitions on the same container. If a storageset or disk drive fails before its data is written to it, the controller reports an unwriteable data error. The `CLEAR_ERRORS` *`unit-number`* `UNWRITEABLE_DATA` command removes the data from the cache and clears the unwriteable data error.

Caution: This command causes data loss.

Syntax

`CLEAR_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`

Note: Because misuse of this command causes data loss, the command cannot be abbreviated.

Parameters

The following parameter supports the `CLEAR_ERRORS UNWRITEABLE_DATA` command:

unit-number

Identifies the unit having the unwriteable data error. The *`unit-number`* is the name given to the unit at the time it was created with the `ADD UNITS` command.

Switches

There are no switches associated with this command.

Example

To clear the unwriteable data error on disk unit D103, enter:

```
CLEAR_ERRORS D103 UNWRITEABLE_DATA
```

See Also

CLEAR_ERRORS CLI
CLEAR_ERRORS *controller* INVALID_CACHE
CLEAR_ERRORS *unit-number* LOST_DATA
CLEAR_ERRORS *device-name* UNKNOWN

CONFIGURATION RESET

Erases the entire subsystem configuration data file stored in the nonvolatile memory (NVRAM) of "this controller." This command also restores the default configuration of the controller and shuts down the controller. Press the controller **Reset** (//) button to restart the controller after the controller is reset with the `CONFIGURATION RESET` command.

Note: This command sets the controller to a default configuration and shuts down the controller, disabling communication between host and controller. Enter new configuration information through the `SET` *`controller`* command or the `CONFIGURATION RESTORE` command to make the controller operational.

This command does *not* erase the configuration file that was stored on disk with the `INITIALIZE` *`container-name SAVE_CONFIGURATION`* command.

Note: Before issuing this command, ensure the subsystem configuration is saved:

- In single-controller subsystems, the configuration is saved on the disk array. If a container has the *`SAVE_CONFIGURATION`* switch specified at the time it is initialized (through the `INITIALIZE` command), the disks that constitute that container (excluding JBODs) are able to save a copy of the configuration. If the container is a JBOD, the container must be made into a unit in order to have the configuration saved on it.
- Ensure the latest subsystem configuration is stored on disk for single controller subsystems by way of the `CONFIGURATION SAVE` command.
- For dual-redundant controllers, the configuration is stored in the companion controller.

Specify the `CONFIGURATION RESET` command on "this controller" in No Failover mode (`SET NOFAILOVER` or `SET NOMULTIBUS_FAILOVER` command) only. Enter this command to ensure all of the old configuration information is removed before a controller module is to be moved from one subsystem to another.

The following provides guidelines for establishing a configuration after using the `CONFIGURATION RESET` command:

- For single-controller subsystems, follow the configuration information guidelines below:
  - New subsystem configuration information can be re-entered by using the `SET THIS_CONTROLLER` command.
  - Saved subsystem configuration information can be re-established by using the `CONFIGURATION RESTORE` command.
- For dual-redundant controller subsystems, follow the configuration information guidelines below:

  Dual-redundant controller subsystems have the configuration information stored on the "other controller" and do not need to use the `INITIALIZE` *`container-name SAVE_CONFIGURATION`* command.
  - New subsystem configuration information can be re-established by using the `SET FAILOVER` *`COPY=controller`* or `SET MULTIBUS_FAILOVER` *`COPY=controller`* command. These CLI commands *copy* the configuration file from the defined controller nonvolatile memory and place the file into the redundant controller nonvolatile memory. For example, use `SET FAILOVER` *`COPY=OTHER_CONTROLLER`* or `SET MULTIBUS_FAILOVER` *`COPY=OTHER_CONTROLLER`* executed from "this controller" to place the "other controller" configuration file into the "this controller" nonvolatile memory.

Tip: An alternative method for erasing subsystem configuration data stored in NVRAM is through the controller operator control panel (OCP). To initiate the `CONFIGURATION RESET` command through the OCP:

1. Push and hold the **Port #5** button, and then momentarily press the **Reset** button.
2. Continue holding the **Port #5** button until the **Port #5** button LED starts flashing.
3. Release the **Port #5** button.

Refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide* for configuration reset usage in controller replacement instructions for single-controller and dual-redundant subsystems.

Syntax

```
CONFIGURATION RESET
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To erase the subsystem configuration information in “this controller,” enter:

```
CONFIGURATION RESET
```

See Also

CONFIGURATION RESTORE
CONFIGURATION SAVE
INITIALIZE

CONFIGURATION RESTORE

Copies the subsystem configuration information from the configuration file saved on disk into the NVRAM of "this controller." This command locates the most recent configuration file saved on disk and restores it. This command causes a reboot and takes effect immediately.

Note: Use this command for a single-controller configuration only. HP *does not* recommend using this command for controllers in a dual-redundant configuration.

Before using the `CONFIGURATION RESTORE` command, HP recommends that you use the controller OCP while inserting the controller into its connector slot to reset it. Refer to controller replacement procedures for single-controller subsystems in the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Maintenance and Service Guide*.

Caution: If a disk is moved from one subsystem to another, and it contains configuration information, perform a `CONFIGURATION SAVE` command to synchronize the new disk with the subsystem configuration.

Tip: To initiate the `CONFIGURATION RESTORE` command from the controller OCP:

1. Push and hold **Port #6** button, and then momentarily press the **Reset** button.
2. Continue holding the **Port #6** button until the **Port #6** button LED starts flashing.
3. Release the **Port #6** button.

Tip: If the controller you are installing was previously used in another subsystem, the controller restarts with the configuration that resides in its nonvolatile memory. If this differs from the current configuration of the subsystem, you can purge the controller's old configuration with the following command:

```
CONFIGURATION RESET
```

After invoking the `CONFIGURATION RESET` command, press the **Reset** button to start the controller and then submit the `CONFIGURATION RESTORE` command to restore the current configuration.

Note: For single-controller configurations, the `INITIALIZE` *`container-name SAVE_CONFIGURATION`* command must be used to save controller configuration information to a disk in order to reset the configuration or to restore the configuration (see the commands on page 109, page 144, page 115, and page 139 for more information).

Syntax

```
CONFIGURATION RESTORE
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To restore the subsystem configuration into the memory of the controller in a single-controller subsystem, enter:

```
CONFIGURATION RESTORE
```

See Also

CONFIGURATION RESET
CONFIGURATION SAVE
INITIALIZE

CONFIGURATION SAVE

Forces the controller to copy the subsystem configuration information in its NVRAM memory onto a configuration file on the disk array. This allows you to know whether a copy of the configuration is saved. The command takes effect immediately.

Tip: Use the `INITIALIZE` *`container-name SAVE_CONFIGURATION`* command to set up the location of the configuration file on the specified container and to save the current subsystem configuration.

The controller updates the configuration file on the disk array after configuration changes. This command forces an immediate update. In single-controller subsystems, the configuration is saved on the disk array. If a container had the *`SAVE_CONFIGURATION`* switch specified while it was initialized (through the `INITIALIZE` command), the disks that constitute that container (excluding JBODs) are able to save a copy of the configuration. If the container is a JBOD, the container must be made a unit in order for the configuration to be saved on it.

Note: Use this command for a single controller configuration only. HP *does not* recommend using this command on controllers in a dual-redundant configuration.

Syntax

```
CONFIGURATION SAVE
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To save the subsystem configuration into the memory of the controller in a single-controller subsystem, enter:

```
CONFIGURATION SAVE
```

See Also

CONFIGURATION RESET
CONFIGURATION RESTORE
INITIALIZE
REINITIALIZE *container-name*

CREATE_PARTITION

Divides a non-transportable disk drive or storageset into several separately addressable storage units. The command marks a specified percentage of a disk drive or storageset to be used as a separately addressable unit—a partition. Any non-transportable disk or storageset can be divided into a maximum of eight partitions, then each partition can be separately presented to the host.

Initialize all disks and storagesets before creating or destroying partitions.

Caution: Issuing an `INITIALIZE` command on either disks or storagesets destroys any existing partitions without warning.

Syntax

`CREATE_PARTITION` *`container-name SIZE=percent`*

Parameters

The following parameter supports the `CREATE_PARTITION` command:

container-name

Identifies the disk or storageset to partition. This is the same name given to the disk or storageset at the time it was created with the `ADD` command (for example, `ADD DISKS`, `ADD STRIPESETS`, and so forth). Any disk, stripeset, mirrorset, striped mirrorset, or RAIDset can be partitioned. A transportable disk cannot be partitioned. You must initialize the container before creating the first partition.

Switches

The following switch is associated with the CREATE_PARTITION command:

- *SIZE*

SIZE=percent
SIZE=LARGEST

Specifies the size of the partition to be created as a percentage of the total container storageset size:

- Specify *SIZE=percent* to create a partition on the specified container that is a percentage of the container's total capacity. Up to eight partitions can be created on any one container.

Note: The resulting partition is slightly smaller than the size specified because metadata also occupies some of the space allocated to the partition.

- Specify *SIZE=LARGEST* to:
  - — Have the controller create the largest partition possible from unused space on the disk or storageset.
  - — Create the last partition on a container. Because the remaining space is not equal to an exact percentage value, specifying *SIZE=LARGEST* allows you to optimize use of the remaining space.

Example

To create a RAIDset named RAID9, divide it into four equal parts, and create host-addressable units for each partition, enter:

```
ADD RAIDSETS RAID9 DISK10000 DISK20100 DISK30200
INITIALIZE RAID9
CREATE_PARTITION RAID9 SIZE=25
CREATE_PARTITION RAID9 SIZE=25
CREATE_PARTITION RAID9 SIZE=25
CREATE_PARTITION RAID9 SIZE=LARGEST
ADD UNITS D101 RAID9 PARTITION=1
ADD UNITS D102 RAID9 PARTITION=2
ADD UNITS D103 RAID9 PARTITION=3
ADD UNITS D104 RAID9 PARTITION=4
```

See Also

ADD UNITS
DELETE *unit-number*
DESTROY_PARTITION
SET *unit-number*
SHOW *unit-number*

DELETE *association-set-name*

Deletes an existing association set.

Note: This command works only in a DRM environment and requires an HSG80 Array Controller with ACS V8.8-*x*P. Like all DRM commands, use of this command is heavily restricted. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for examples of usage.

Syntax

`DELETE` *`association-set-name`*

Parameters

The following parameter supports the `DELETE` command:

association-set-name

Identifies the name of the association set to be deleted.

Switches

There are no switches associated with this command.

Examples

To delete association set AS4, enter:

```
DELETE AS4
```

See Also

`ADD ASSOCIATIONS`
`SET` *`association-set-name`*

DELETE *concatset-name*

Deletes an existing concatset. If the concatset is associated with a unit, the unit must be deleted before deleting the concatset.

Syntax

`DELETE` *`concatset-name`*

Parameters

The following parameter supports the `DELETE` command:

concatset-name

Identifies the name of the concatset to be deleted.

Switches

There are no switches associated with this command.

Examples

To delete concatset C1, which is associated with unit D0, enter:

```
DELETE D0
DELETE C1
```

See Also

`DELETE` *`unit-number`*
`SET` *`concatset-name`*

DELETE *connection-name*

Deletes a specified connection from the table of known connections maintained by the controller, whether or not the host adapter is still physically connected to a controller port.

A table of known host connections is maintained in controller memory. After a connection is added to the table, it stays there, even if the physical connection between host adapter and controller port is severed. The only way to remove a connection from the table is through this command.

Note: A connection with an access path *explicitly* enabled on a unit cannot be deleted. The access path is enabled explicitly through the *`ENABLE_ACCESS_PATH`* qualifier of the `ADD UNITS` or `SET` *`unit-number`* commands. If the access path is generically enabled for all connections (*`ENABLE_ACCESS_PATH= ALL`*), then any or all connections can be deleted. A connection with explicit access path must have the access path disabled (through the *`DISABLE_ACCESS_PATH`* switch of the `SET` *`unit-number`* command) before the connection can be deleted.

Syntax

`DELETE` *`connection-name`*

Parameters

The following parameter supports the `DELETE` command:

connection-name

Identifies the name given to the host connection. The connection name is one of the following:

- The default name assigned to the host connection after it was physically connected to the controller port. Default names are of the form `!NEWCON`*`nn`*.
- The name given through the `RENAME` command.
- The name given through the `ADD CONNECTIONS` command.

Switches

There are no switches associated with this command.

Examples

To delete host connection Server1 from the table of known connections (unless the access path to Server1 is specifically enabled for one or more units), enter:

```
DELETE SERVER1
```

To delete host connection Server4 from the table of known connections while Server4 has explicit access path to unit D7, enter:

```
SET D7 DISABLE_ACCESS_PATH=SERVER4
DELETE SERVER4
```

See Also

ADD CONNECTIONS
ADD UNITS
SET *connection-name*
SET *unit-number*
SHOW CONNECTIONS
SHOW *connection-name*

DELETE *container-name*

Deletes a specified container belonging to the controller configuration.

Note: A container cannot be deleted if the container is in use by a higher-level container. For example, a disk belonging to a member of a RAIDset, or a RAIDset unit, cannot be deleted. To delete a member of one of these storagesets, the higher-level container or containers must be deleted first.

Also, to delete a unit that belongs to a remote copy set, the remote copy set must be deleted first. (There is one exception to this rule: a remote (target) member of a remote copy set can be deleted from the copy set.)

Note: This command *does not* delete failedsets or sparesets (see `DELETE FAILEDSETS` on page 126 and `DELETE SPARESETS` on page 129 for details).

After a storageset is deleted, the individual disks are free to be used by another container. If you create the container again with the exact same disk configuration, and none of the disks are used for anything or initialized, the container can be reassembled using its original disks.

Syntax

`DELETE` *`container-name`*

Parameters

The following parameter supports the `DELETE` command:

container-name

Identifies the container to be deleted. This is the name given to the container at the time it was created using the `ADD` command (for example, `ADD DISKS`, `ADD STRIPESETS`, and so forth).

Switches

There are no switches associated with this command.

Examples

To delete a disk drive named DISK10000, enter:

```
DELETE DISK10000
```

To delete a stripeset named STRIPE1, enter:

```
DELETE STRIPE1
```

To delete a RAIDset named RAID9, enter:

```
DELETE RAID9
```

See Also

DELETE FAILEDSETS
DELETE SPARESETS
SHOW STORAGESETS
UNMIRROR

DELETE FAILEDSETS

Removes a disk drive from a failedset. The failedset contains disk drives that were:

- Removed by the controller from RAIDsets and mirrorsets because they failed.
- Manually removed using the `SET` command (for example, `SET` *`mirrorset-name`* or *`REMOVE=disk-name`*).

Enter the `DELETE FAILEDSETS` command before physically removing failed members from the storage enclosure for testing, repair, or replacement.

You should consider all disk drives in the failedset to be defective. Repair or replace disks found in the failedset.

Syntax

`DELETE FAILEDSETS` *`disk-name`*

Parameters

The following parameter supports the `DELETE FAILEDSETS` command:

disk-name

Identifies the disk you want to delete from the failedset. Remove only one disk at a time from a failedset.

Switches

There are no switches associated with this command.

Example

To delete DISK20200 from the failedset, enter:

```
DELETE FAILEDSETS DISK20200
```

See Also

SET FAILEDSET
SHOW FAILEDSETS

DELETE *remote-copy-set-name*

Deletes a specified remote copy set. Upon completion of this command, the target unit is no longer a member of the remote copy set.

Note: This command works only in a DRM environment and requires an HSG80 Array Controller with ACS, V8.8-*x*P. Like all DRM commands, use of this command is heavily restricted. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for examples of usage.

This command works only on the site acting as initiator. This is the local site except in a failover situation.

This command is only valid if the error mode of the remote copy set is normal. The error mode is set by the *ERROR_MODE* switch of the `SET` *`remote-copy-set-name`* command.

If the remote copy set is a member of an association set, the association set must be deleted before the remote copy set is deleted.

Syntax

```
DELETE remote-copy-set-name
```

Parameters

The following parameter supports the `DELETE` command:

remote-copy-set-name

Identifies the name given to the remote copy set that is to be deleted.

Switches

There are no switches associated with this command.

Examples

To delete RCS1, enter:

```
DELETE RCS1
```

See Also

ADD REMOTE_COPY_SETS
SET *remote-copy-set-name*
SHOW REMOTE_COPY_SETS
SHOW *remote-copy-set-name*

DELETE SPARESETS

Removes a disk drive from the spareset. The spareset contains disk drives that are available for use, but not yet added to the controller configuration.

Syntax

`DELETE SPARESETS` *`disk-name`*

Parameters

The following parameter supports the `DELETE SPARESETS` command:

disk-name

Identifies the disk drive to be deleted from the spareset. Remove only one disk at a time from a spareset.

Switches

There are no switches associated with this command.

Example

To remove DISK20300 from the spareset, enter:

```
DELETE SPARESETS DISK20300
```

See Also

`ADD SPARESETS`
`SHOW SPARESETS`

DELETE *unit-number*

Deletes a unit from the subsystem configuration. The `DELETE` *`unit-number`* command flushes user data from the writeback cache to the disks and deletes the specified unit. The command deletes the association of the unit with its underlying device, storageset, RAIDset, or partition. The container and any data in it are left intact.

If any errors occur while trying to flush the user data, the logical unit is not deleted. To delete a unit that has existing errors, you must clear all the errors using a `CLEAR_ERRORS` command.

Syntax

`DELETE` *`unit-number`*

Parameters

The following parameter supports the `DELETE` command:

unit-number

Identifies the unit number to be deleted. The *`unit-number`* is the same name given to the unit at the time it was created using the `ADD UNITS` command.

Switches

There are no switches associated with this command.

Example

This example shows how to delete disk unit number D103:

```
DELETE D103
```

See Also

`ADD UNITS`
`CLEAR_ERRORS` *`unit-number`* `LOST_DATA`
`CLEAR_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`

```
DELETE container-name
DELETE FAILEDSETS
DELETE SPARESETS
DESTROY_PARTITION
```

DESTROY_PARTITION

Removes a partition from a container. Marks the area reserved for a partition as available. The available area is then consolidated with any adjacent free areas.

Caution: Data contained on a partition is lost after you enter the `DESTROY_PARTITION` command.

You cannot destroy a partition that is assigned a unit number. You must first enter the `DELETE` *`unit-number`* command to delete the unit that is using the partition. After all partitions are destroyed, the container from which they were created must be initialized.

Syntax

```
DESTROY_PARTITION container-name
PARTITION=partition-number
```

Parameters

The following parameters support the `DESTROY_PARTITION` command:

- *container-name*
- *partition-number*

These parameters are described in the following paragraphs.

container-name

Identifies the disk or storageset containing the partition to be destroyed. This is the name given to the container after it was created using the `ADD` command (for example, `ADD DISKS`, `ADD STRIPESETS`, and so forth).

partition-number

Identifies the partition to be destroyed. Use the `SHOW DISKS`, `SHOW STORAGESETS`, `SHOW STRIPESETS`, or `SHOW RAIDSETS` command to identify the correct partition before submitting the `DESTROY_PARTITION` command.

Switches

There are no switches associated with this command.

Example

To delete the unit for partition 2 on RAIDset RAID9 and destroy the partition, enter:

```
DELETE D102
DESTROY_PARTITION RAID9 PARTITION=2
```

If partition 2 of RAID9 has not yet been assigned a unit number, to delete partition 2, enter:

```
DESTROY_PARTITION RAID9 PARTITION=2
```

See Also

CREATE_PARTITION
DELETE *unit-number*
INITIALIZE
SHOW DISKS
SHOW RAIDSETS
SHOW STORAGESETS
SHOW STRIPESETS

DIRECTORY

Displays a list of the diagnostics and utilities available on "this controller."

Syntax

```
DIRECTORY
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To display a directory listing, enter:

```
DIRECTORY
```

The following is an example of the resultant display.

```
HSUTIL     V88P D
FRUTIL     V88P D
CHVSN      V88P D
CLCP       V88P D
CLONE      V88P D
CLONEW     V88P D
CONFIG     V88P D
DILX       V88P D
DIRECT     V88P D
DSTAT      V88P D
DWNGRD     V88P D
FMU        V88P D
VTDPY      V88P D
```

Figure 1: Screen display after issuing the DIRECTORY command

Note: In Figure 1 on page 134, note that *CHVSN*, *DSTAT*, and *DWNGRAD* are not user utilities. These utilities are used by HP authorized service providers only.

See Also

RUN

EXIT

Terminates a remote virtual terminal connection. Use of this command exits the CLI program and returns control to the host.

Syntax

```
EXIT
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To terminate the CLI program, enter:

```
EXIT
```

HELP

Displays a brief explanation of how to obtain help on any command or CLI function by using the question mark (?) character.

Note: A character space must precede the question mark.

Syntax

HELP

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

To display information regarding the HELP command, enter:

```
HELP
```

Figure 2 shows the Help screen that is dispalyed after you enter the HELP command.

```
Help may be requested by typing a question mark (?) at the CLI prompt.
This will print a list of all available commands.

For further information you may enter a partial command and enter a
space followed by a (?) to print a list of all available options at that
point in the command. For example:

                        SET THIS_CONTROLLER?

Prints a list of all legal SET THIS_CONTROLLER commands.
```

Figure 2: Help screen

To list all legal commands pertaining to a specific CLI command: enter the command, type a space, and enter a question mark. For example:

```
SET?
```

INITIALIZE

Initializes metadata on the specified container. During initialization, a small amount of disk space is reserved for metadata that the controller uses to keep track of the array. This metadata is inaccessible to the host. Disks made transportable (using the *TRANSPORTABLE* switch of the ADD DISKS command) do not contain metadata. Units are not initialized; a container is initialized before being assigned to a unit.

Caution: Observe the following precautions associated with INITIALIZE command:

- The INITIALIZE command destroys all metadata on the container unless you use the *NODESTROY* switch. The drive does not have the error detection and data security provided by the metadata that is on *NOTRASPORTABLE* disks.
- The *NODESTROY* switch is valid only on mirrorsets and striped mirrorsets. If a partitioned container is initialized, all partitions are eliminated.
- Issuing an INITIALIZE command on either disks or storagesets destroys any existing partitions without warning.

Note: Before using or reusing disk devices for storagesets and units that are configured under ACS V8.7-*x* (or an earlier version), initialize disk devices under the current ACS version before creating and initializing new storage containers and units.

Use the INITIALIZE command:

- Before creating a unit from a newly installed disk.
- Before creating a unit from a newly created RAIDset, stripeset, or mirrorset.
- To destroy all existing partitions on a container.

Note: If you issue the `INITIALIZE` *`SAVE_CONFIGURATION`* CLI command on a JBOD disk to save the controller configuration while the unit is not above the container, the command appears to work, but the save operation does not occur. You must place the unit above the JBOD, and then issue the `INITIALIZE` *`SAVE_CONFIGURATION`* to accomplish this task.

Syntax

`INITIALIZE` *`container-name`*

Parameters

The following parameter supports the `INITIALIZE` command:

container-name

Specifies the container to initialize. This is the same name given to the disk or storageset after it was created using the `ADD` command (for example, `ADD DISKS`, `ADD STRIPESETS`, and so forth).

Switches

The following switches are are available for the `INITIALIZE` *`container-name`* command:

- Geometry switches
  - *`CAPACITY`*
  - *`CYLINDERS`*
  - *`HEADS`*
  - *`SECTORS_PER_TRACK`*
- *`CHUNKSIZE`*
- *`DESTROY` and `NODESTROY`*
- *`DESTROY_MBR`*
- *`SAVE_CONFIGURATON` and `NOSAVE_CONFIGURATION`*

These switches are described in the following paragraphs.

CAPACITY=n (1 to the maximum container size in blocks)

Note: After executing the `INITIALIZE` command with the *`CAPACITY`* switch, it appears that the command did not complete because the `SHOW` *`disk-name`* command does not display any change to the size. It shows the total size of the disk, not the new size.

The new size is not seen until the corresponding unit is added. The command `SHOW` *`disk-name`* displays the new size.

Example:

```
HSG80> INITIALIZE DISKxxxxx CAPACITY=4000000
HSG80> SHOW DISKxxxxx
```

Note: The new capacity is not seen after this command.

To show the new size, enter:

```
HSG80> ADD UNIT Dx
HSG80> SHOW Dx
```

CYLINDERS=n (1 to16,777,215)
HEADS=n (1 to 255)
SECTORS_PER_TRACK=n (1 to 255)

Sets the geometry switches reported to the host.

Note: The geometry switches should not be used unless there is a compatibility problem with the existing defaults.

The geometry switches for the `INITIALIZE` command are ignored after you create partitions. The geometry switches supplied with the `CREATE_PARTITION` command are used by the unit.

CHUNKSIZE=DEFAULT *(default)*
CHUNKSIZE=n

Specifies the block chunk size to be used for RAIDsets and stripesets. Specify the chunk block size by entering *CHUNKSIZE=n*, or allow the controller to set the chunk size by entering *CHUNKSIZE=DEFAULT*.

Note: The *CHUNKSIZE* switch is only valid with stripesets and RAIDsets.

The default chunk size for storagesets with less than or equal to nine members is 256 blocks or 128 kilobytes (K). The default chunk size for storagesets with more than nine members is 128 blocks or 64 K. HP *does not* recommend a chunk size less than 128 blocks (64 K).

Note: The system automatically rounds specified chunk sizes for all newly created containers up to the next block size that is divisible by 8. This automated feature helps to minimize performance issues and enhance controller performance. This feature applies to only those containers created *after* the installation of ACS V8.8-*x*.

Note: The default chunk size should be used with caution. It is imperative that you analyze the I/O transfers being used with your application to determine the proper chunk size. An improper value used as a chunk size can cause serious performance problems with the subsystem.

Refer to the detailed description of chunk size that is contained in the controller installation and configuration guide for information regarding recommended chunk size settings for this application.

Note: The initial premise that is published in some customer forums suggesting the use of prime numbers is derived from a modeling technique that identifies how to best optimize performance without regard to the implementation of the chunking algorithms internal to the controller. Testing and experience shows that critical boundaries that degrade the unit performance are at times experienced. Adjusting the actual chunk size to an adjacent number divisible by 8 (from the selected prime number) achieves the results of the modeling techniques and alleviates the potential for degraded performance.

DESTROY *(default)*
NODESTROY

Controls how the metadata on the initialized container is to be handled.

Note: The *DESTROY* and *NODESTROY* switches are valid only with striped mirrorsets and mirrorsets.

- Specify *NODESTROY* to preserve forced error metadata during the initialization process. Use the *NODESTROY* switch only if a unit is to be created from disk drives reduced from mirrorsets. This allows the data on the container to be accessed by a mirrorset or striped mirrorset unit. The *NODESTROY* switch is not valid for RAIDsets, simple stripesets, and single-disk configurations.
- Specify *DESTROY* to overwrite user data and forced error flags during the initialization.

DESTROY_MBR

Eliminates the factory-written master boot record (MBR) block information on HP factory-shipped disks and allows you to create a single unallocated partition on a new disk device.

Caution: After an `INITIALIZE` *`DISKnnnnn DESTROY_MRB`* is issued, the command writes data into the data area of the disk device.

Tip: Partitions can be optionally created at the controller (controller paritioning) or at the Windows OS through the disk administrator as host partitions.

After using this switch, information is written to the data area of the disk.

Note: Factory-shipped disks are typically partitioned. HP does not recommend presenting new disks that are partitioned to a controller that is initially part of a Windows-based system. Before adding new disks to a subsystem that presents units to host systems that uses Windows operating systems, HP recommends that you add the disk to the array and then issue the `INITIALIZE` *`DISKxxxx`* command with the *`DESTROY_MBR`* switch for all new factory-shipped disks and replacement spares. This action eliminates the MBR block that is factory-written on new disk drives before they are shipped from HP.

Failure to destroy the MBR block of new factory-shipped disks causes Windows to create two single unallocated partitions. After issuance of this command and presentation of the disk to a Windows host as a unit, the device is seen as a single drive letter device.

If two disks are discovered (one being an 8-MB partition) after presenting a new unit to a Windows host, use caution in identifying the correct disk number to delete.

Enter the following command to initialize disk DISK031000 and destroy its MBR partition:

```
INITIALIZE DISK031000 DESTROY_MBR
```

SAVE_CONFIGURATION
NOSAVE_CONFIGURATION *(default)*

Instructs the controller to save the controller configuration (or not to save the configuration) to the container being initialized. If enabled, the *`SAVE_CONFIGURATION`* switch, which is only supported on single-controller configurations, saves a configuration to a disk or storageset. The configuration can be retrieved later and downloaded onto a replacement controller. It also retains code patches to the ACS software.

Note: Use this switch for a single-controller configuration only. HP *does not* recommend using this switch for controllers in a dual-redundant configuration.

Note: If any storageset within the configuration was previously initialized with the `INITIALIZE` *`container-name SAVE_CONFIGURATION`* command to save the configuration to disk, it is not necessary to reconfigure devices with a new controller.

Also, some devices within containers that were initialized with the *`SAVE_CONFIGURATION`* switch in earlier versions of ACS firmware (V8.5 through V8.6-9), may no longer display a status as a configuration saving device. You can validate the save configuration usage by issuing the `SHOW DEVICE_INFO` *FMU* command. Refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide* for additional information under the `SHOW DEVICE_INFO` *FMU* command.

Note: ACS saves any installed software patches on disks initialized with the *`SAVE_CONFIGURATION`* command. To replace a controller and restore the configuration from a disk, you do not have to reinstall any software patches.

Note: If you enable the *`SAVE_CONFIGURATION`* switch by issuing `INITIALIZE` *`diskxyyzz SAVE_CONFIGURATION`* command for a JBOD disk, the configuration is not saved to the device until the unit is placed above the device. A unit is placed above the device after issuing the `ADD UNITS` *`dx diskxyyzz`*. After issuing the `SHOW DEVICES` *`FULL`* command, the subsequent screen display does *not* show the configuration saved to the disk until it has a unit above it as well. To utilize a single JBOD disk as a *`SAVE_CONFIGURATION`* device, you must initialize the device with *`SAVE_CONFIGURATION`* *and* place a unit on top of it. The unit does *not* have to be enabled to any host.

If you enable a container with *`SAVE_CONFIGURATION`* switch, the member devices are used for save configuration operation, and after you issue the `SHOW DEVICES` *`FULL`* command, the subsequent screen display indicates that the member devices are utilized for save configuration operations.

The *`SAVE_CONFIGURATION`* switch requires only one disk to be initialized with this option. However, more disks can be used, if desired, for redundancy.

- Specify *SAVE_CONFIGURATION* to store a copy of the controller configuration on the container being initialized. A new controller can retrieve information from a container containing configuration information saved with the *SAVE_CONFIGURATION* switch. If you specify *SAVE_CONFIGURATION* for a multi-device storageset, such as a stripeset, the complete controller configuration information is stored on each disk drive in the storageset.
- A disk drive initialized with the *SAVE_CONFIGURATION* switch specified has slightly less storage space available for user data.
- Specify *NOSAVE_CONFIGURATION* if you do not want to store a copy of the controller configuration on a container.

Examples

To initialize container DISK10000 and save a copy of the controller configuration on it, enter:

```
INITIALIZE DISK10000 SAVE_CONFIGURATION
ADD UNIT D77 DISK10000
```

To initialize RAIDset RAID4 and to reserve an area for configuration information on all the disks that constitute RAID4, enter:

```
INITIALIZE RAID4 SAVE_CONFIGURATION
```

To initialize stripeset STRIPE1 with the default chunk size, enter:

```
INITIALIZE STRIPE1
```

Note: Note that the chunk size is not specified, so the controller initializes the unit with the default chunk size.

To initialize RAIDset RAID9 with a chunk size of 20, enter:

```
INITIALIZE RAID9 CHUNKSIZE=20
```

To initialize DISK40400 and preserve the data after it is removed (reduced) from a mirrorset, enter:

```
REDUCE DISK40400
INITIALIZE DISK40400 NODESTROY
```

To show the devices with the *SAVE_CONFIGURATION* switch enabled, enter the following command. The screen shown in Figure xx on page is displayed.

```
SHOW DEVICES FULL
```

```
Name        Type         Port         Targ  Lun Used by
--------------------------------------------------------------------------
DISK10000   disk            1            0          0S2
            DEC      RZ28M    (C) DEC 2004
        Switches:
         NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED=20MHZ (synchronous 10.00 MHZ negotiated)
         LOCAL
        Size: 4108970 blocks
        Configuration being backed up on this container
DISK30300   disk            3            3          0S2
            DEC      RZ28M    (C) DEC 2004
         Switches:
         NOTRANSPORTABLE
         TRANSFER_RATE_REQUESTED=20MHZ (synchronous 10.00 MHZ negotiated)
         LOCAL
        Size: 4108970 blocks
        Configuration being backed up on this container
```

Figure 3: Screen display after issuing the SHOW DEVICES FULL command

To initialize disk DISK031000, and destroy its MBR information, enter:

```
INITIALIZE DISK031000 DESTROY_MBR
```

See Also

ADD DISKS
ADD MIRRORSETS
ADD RAIDSETS
ADD STRIPESETS
ADD PASSTHROUGH
ADD UNITS
CONFIGURATION RESET
CONFIGURATION RESTORE
CONFIGURATION SAVE
CREATE_PARTITION
MIRROR
REINITIALIZE *container-name*

LOCATE

Facilitates discovery of the physical location of configured units, storagesets, and devices by flashing the device fault LED on the front of the storage device. A flashing LED helps to distinguish between located devices and failed devices.

The `LOCATE` command causes the device fault LED to function as follows:

- Flashes once per second on a good device. The LED turns off with the `LOCATE CANCEL` command.
- Illuminates continuously on a failed device. The LED stays on even after being turned off with the `LOCATE` or `CANCEL` command.

Note: The `LOCATE` command can also be used to test the device fault LED. Not all devices provide a device fault LED; therefore, these devices cannot be identified using the `LOCATE` command.

Syntax

`LOCATE <parameter>`

Parameters

The following parameters support the `LOCATE` command:

- *ALL*
- *CANCEL*
- *container-name*
- *DISKS*
- *ptl*
- *UNITS*
- *unit-number*

These parameters are described in the following paragraphs.

Note: Only one of the following parameters can be entered with each `LOCATE` command.

ALL

Causes the device fault LEDs of all configured devices to flash. Specify `ALL` to test all of the LEDs at once.

CANCEL

Turns off all device fault LEDs turned on with the `LOCATE` command.

container-name

Causes the device fault LEDs on the devices within the *`container-name`* to flash. If a device name is given, the device fault LED flashes. If a storageset name is given, the fault LED on all of the devices assigned to the storageset flashes.

DISKS

Causes the device fault LEDs on all configured disks to flash.

ptl (scsi-port-target-lun)

Causes the device fault LED on the device at the given SCSI location to flash.

UNITS

Causes the device fault LEDs on all devices used by the units to flash.

Tip: This parameter is useful for determining which storage devices are not currently configured into logical units.

---

unit-number

Causes the device fault LEDs on the devices making up the *`unit-number`* to flash.

Switches

There are no switches associated with this command.

Examples

To cause the device fault LED on device DISK10000 to flash, enter:

```
LOCATE DISK10000
```

To cause the device fault LEDs on all of the devices assigned to disk unit number D102 to flash, enter:

```
LOCATE D102
```

To cause the device fault LEDs on all configured disk devices to flash, enter:

```
LOCATE DISKS
```

To turn off the device fault LEDs that are flashing on all devices, enter:

```
LOCATE CANCEL
```

MIRROR

Creates a one-member mirrorset from a single disk and names it.

Note: This command is *only used* on disks already configured as units.

Use the `ADD MIRRORSETS` command to create a mirrorset from disk drives not already members of higher-level containers.

After the disk drive is converted to a mirrorset, increase the nominal number of members by entering the `SET` *`mirrorset-name MEMBERSHIP=number-of-members`* command, then enter the `SET` *`mirrorset-name REPLACE=disk-name`* command to add more members to the mirrorset.

Caution: If you change this cache setting, you should do so with minimal or no load to the controller. If you do so, the controller can become inoperable after the change in this setting takes place.

Syntax

```
MIRROR disk-name mirrorset-name
```

Parameters

The following parameters support the `MIRROR` command:

- *`disk-name`*
- *`mirrorset-name`*

These parameters are described in the following paragraphs.

disk-name

Specifies the name of the disk to convert to a one-member mirrorset. The disk must be part of a unit.

mirrorset-name

Assigns a name for the mirrorset. The *mirrorset-name* can consist of a maximum of nine printable characters excluding commas and backslashes.

It is common to name a mirrorset MIRR*n*, where *n* is a sequentially assigned, unique identifier. Other naming conventions are acceptable, but this naming convention provides both the type of container and its unique identifier.

Switches

The following switches support the MIRROR command:

- *COPY*
- *POLICY and NOPOLICY*

These switches are described in the following paragraphs.

COPY=FAST
COPY=NORMAL (default)

Sets the speed at which the controller copies data to a new member from normal mirrorset members if data is being mirrored to the storageset disk drives:

- Specify *COPY=FAST* to allow the creation of mirrored data to take precedence over other controller operations. If you specify *COPY=FAST*, the controller uses more resources to create the mirrored data, and copying takes less time. However, overall controller performance is reduced.
- Specify *COPY=NORMAL* if you want operations performed by the controller to take priority over the copy operation. If you specify *COPY=NORMAL* creating the mirrored data has a minimal impact on performance.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement disk from the spareset if a mirrorset member fails.

- Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the mirrorset was initialized). If there is more than one disk drive in the spareset that meets the criteria, the controller selects a disk drive with the best performance.
- Specify *POLICY=BEST_PERFORMANCE* to choose a replacement disk drive from the spareset with the best performance. The controller attempts to select a disk on a different port than existing mirrorset members. If there is more than one disk drive in the spareset matching the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size.
- Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. This causes the mirrorset to operate in a Reduced state until either *POLICY=BEST_PERFORMANCE* or *POLICY=BEST_FIT* is selected or a member is manually placed in the mirrorset (see SET *mirrorset-name* on page 216).

Example

The following steps show how to create a striped mirrorset with full redundancy:

1. Create a normal stripeset.
2. Create a unit from the stripeset.
3. Make each member of the normal stripeset a mirrorset containing two members.

The commands used in the script below set the nominal number of members in each mirrorset to two and add a second disk to each mirrorset. Because the higher-level structure of the stripeset is carried down to the mirrorsets, initialization of the mirrorsets or adding them as units is not necessary.

```
ADD STRIPESETS STRIPE1 DISK10100 DISK20100 DISK30100
INITIALIZE STRIPE1
ADD UNITS D102 STRIPE1
MIRROR DISK10100 MIRROR1
SET MIRROR1 MEMBERSHIP=2
SET MIRROR1 REPLACE=DISK20200
MIRROR DISK20100 MIRROR2
SET MIRROR2 MEMBERSHIP=2
SET MIRROR2 REPLACE=DISK30200
MIRROR DISK30100 MIRROR3
SET MIRROR3 MEMBERSHIP=2
SET MIRROR3 REPLACE=DISK10200
```

See Also

ADD MIRRORSETS
INITIALIZE
REDUCE
SHOW MIRRORSETS
UNMIRROR

POWEROFF

Turns off the power to the subsystem enclosure. The command applies to BA370 enclosure configurations.

Note: Stop all I/O operations between the hosts and controllers before issuing a `POWEROFF` command.

Syntax

```
POWEROFF
```

Parameters

There are no parameters associated with this command.

Switches

The following switches support the `POWEROFF` command:

- *BATTERY* and *BATTERY_OFF*
- *OVERRIDE_BAD_FLUSH* and *NO_OVERRIDE_BAD_FLUSH*
- *SECONDS*

These switches are described in the following paragraphs.

BATTERY_ON
BATTERY_OFF (default)

Instructs the external cache battery (ECB) charger to turn off or remain on.

- Specify *BATTERY_ON* to keep the ECB charger on after the `POWEROFF` command is issued.
- Specify *BATTERY_OFF* to turn off the ECB charger after the `POWEROFF` command is issued.

Note: The ECB LEDs continues to flash in both cases, but the cache module LEDs cease flashing if *BATTERY_OFF* is used.

OVERRIDE_BAD_FLUSH
NO_OVERRIDE_BAD_FLUSH (default)

Instructs the controller to either power off the enclosure or remain on depending on the cache flush results.

- Specify *OVERRIDE_BAD_FLUSH* to override a failed cache flush and power off the enclosure.
- Specify *NO_OVERRIDE_BAD_FLUSH* to prevent a power off if the cache flush fails.

SECONDS=nn

If the POWEROFF command is entered, all disk units in the enclosure are set to write-through. After the time interval, as represented by *nn* seconds, elapses, an orderly rundown of all units is started. After all units in the enclosure are successfully rundown, the enclosure power is turned off. Table 5 on page 157 shows what action is taken depending on the switch settings and the results of the attempted flush.

Caution: If the *BATTERY_OFF* switch is used with the *OVERRIDE_BAD_FLUSH* switch, unwritten data could be lost. Do not power off the subsystem until the unwritten data is recovered.

Table 5: POWEROFF Switch Settings

Battery Switch	Override Switch	Flush Results	Action
BATTERY_ON	*OVERRIDE_BAD_FLUSH*	Success	Controller and units in the enclosure shut down, and the ECB charger remains on.
BATTERY_ON	*OVERRIDE_BAD_FLUSH*	Failure	Controller and units in the enclosure shut down, and the ECB charger remains on.
BATTERY_ON	*NO_OVERRIDE_BAD_FLUSH*	Success	Controller and units in the enclosure shut down, and the ECB charger remains on.
BATTERY_ON	*NO_OVERRIDE_BAD_FLUSH*	Failure	Nothing is shut down, the ECB charger remains on, and the user is notified of a bad flush.
BATTERY_OFF	*OVERRIDE_BAD_FLUSH*	Success	Controller and units in the enclosure shut down, and the ECB charger turns off.
BATTERY_OFF	*OVERRIDE_BAD_FLUSH*	Failure	Controller and units in the enclosure shut down, and the ECB charger turns off.
BATTERY_OFF	*NO_OVERRIDE_BAD_FLUSH*	Success	Controller and units in enclosure shut down, and the ECB charger turns off.
BATTERY_OFF	*NO_OVERRIDE_BAD_FLUSH*	Failure	Nothing is shut down, the ECB charger remains on, and the user is notified of a bad flush.

In dual-redundant mode, if both controllers cannot be shut down, both controllers and associated battery chargers remain on.

Example

To power off the disk units and the enclosure in 10 seconds (*BATTERY_OFF* and *NO_OVERRIDE_BAD_FLUSH* are the defaults), enter:

```
POWEROFF SECONDS=10
```

REDUCE

Removes member disk drives from mirrorsets and decreases the nominal number of members in the mirrorsets.

This command *does not* put reduced members into the failedset (unlike the *REMOVE=disk-name* switch that is used with the SET *mirrorset-name* command). If you are using the REDUCE command to take a snapshot of a striped mirrorset, you must reduce all mirrorsets with one command. The *CLONE* utility does this automatically.

The nominal number of members in a mirrorset is determined by the number of members assigned to the mirrorset with the *MEMBERSHIP=number-of-members* switch that is used with SET *mirrorset-name* command or the *mirrorset-name* and *disk-name1 [disk-nameN]* parameters that are used with the ADD MIRRORSETS command—in other words, the number of disks that the mirrorset originally contained before it was reduced. The actual number of members contained in the mirrorset can be less than the nominal number of members if:

- A disk drive is not added back to the mirrorset.
- A member remains removed from the mirrorset.
- The mirrorset replacement policy *NOPOLICY* switch is specified with the SET *mirrorset-name* command.
- No spare disks exist.

The actual number of members in the mirrorset can never be greater than the nominal number of members. The disks to be removed do not need to be members of the same mirrorset. However, the disks must all be part of the same unit (for example, the same striped mirrorset). If a disk is reduced from a mirrorset, the controller:

- Flushes all unit data from writeback data cache.
- Pauses I/O to the unit.
- Removes the specified disks.
- Decreases the nominal number of members of the mirrorsets by the number of disks removed from the mirrorsets.
- Re-establishes I/O to the unit.

For each reduced mirrorset, there must be at least one remaining normal member after the reduction. If this is not true for all of the disk names specified, the mirrorset is not reduced.

Only normal members can be reduced. A normal member is a mirrorset member whose entire contents are the same as all other normal members within the mirrorset.

Note: An error is displayed if you attempt to reduce any mirrorset so that there would not be any normal member remaining.

Syntax

`REDUCE` *`disk-name1 disk-name2 disk-name3...`*

Parameters

The following parameter supports the `REDUCE` command:

disk-name1 disk-name2 disk-name3...

Specifies the names of the disk or disks to be removed from the mirrorset or mirrorsets. Multiple members can be removed with the `REDUCE` command.

Switches

There are no switches associated with this command.

Example

To remove DISK20100, DISK20200, and DISK40200 from their respective mirrorsets, enter the following commands shown in Figure 4.

```
CLI> SHOW STRIPE1
Name        Storageset              Uses                         Used by
----------------------------------------------------------------------
STRIPE1     stripeset               MIRR1                           D104
                                    MIRR2
                                    MIRR3

CLI> SHOW MIRRORSETS
Name        Storageset              Uses                         Used by
----------------------------------------------------------------------
MIRR1       mirrorset               DISK10100                    STRIPE1
                                    DISK20100
MIRR2       mirrorset               DISK10200                    STRIPE1
                                    DISK20200
MIRR3       mirrorset               DISK30300                    STRIPE1
                                    DISK40200

CLI> REDUCE DISK20100 DISK20200 DISK40200

CLI> SHOW MIRRORSETS
Name        Storageset            Uses                           Used by
----------------------------------------------------------------------
MIRR1       mirrorset             DISK10100                      STRIPE1
MIRR2       mirrorset             DISK10200                      STRIPE1
MIRR3       mirrorset             DISK30300                      STRIPE1
```

Figure 4: Removing disks from a mirrorset

See Also

ADD MIRRORSETS
MIRROR
RUN *(CLONE utility)*
SET *mirrorset-name*
SHOW MIRRORSETS

REINITIALIZE *container-name*

Invokes maintenance actions against initialized containers and modifies container metadata. Also modifies the prior device initialization or acts upon storageset attributes after its most recent initialization.

Caution: Before invoking this command, HP recommends that you record previous controller configuration information for backup purposes.

Syntax

`REINITIALIZE` *`container-name`*

Parameters

There are no parameters associated with this command.

Switches

The following switches support the `REINITIALIZE` *`container-name`* command:

- *SPECIAL_FUNCTION_ONE=INFO*
- *SPECIAL_FUNCTION_ONE=PARTITION*
- *SPECIAL_FUNCTION_ONE=NOPARTITION*
- *TURNSAVEOFF*

These switches are described in the following paragraphs.

SPECIAL_FUNCTION_ONE=INFO

Directs the controller to examine RAID5-only containers and report:

- Which devices, if any, have metadata attributes that are inconsistent as a result of sparing operations to RAID5 sets while operating under ACS V8.7-2 through V8.7-7.
- Which devices have partition flags, no partition flags, or inconsistencies on associated containers.
- Whether attached units exist, if any.

Note: Issuing this command displays information for only those containers or units that are online or assigned to the controller from which the command is issued. If you issue this switch with the `REINITIALIZE` *`container-name`* command for a RAIDset on another controller, the following message displays:

```
Error 9620: Information not available on this controller.
Enter command on other controller.
```

SPECIAL_FUNCTION_ONE=PARTITION

Directs the controller to set the partition flag bits on all devices in a container and establishes the container as a partitioned container. This command can only be used with RAIDset containers.

Caution: Ensure that the container was previously initialized as a partitioned container before using this command. Failure to do so results in loss of access to partitioned data.

Note: Issuing the *`SPECIAL_FUNCTION_ONE=PARTITION`* or the *`SPECIAL_FUNCTION_ONE=PARTITION`* switch in dual-redundant controller configurations causes the container ownership to move to the controller from which the `REINITIALIZE` *`container-name`* command was *not* issued.

SPECIAL_FUNCTION_ONE=NOPARTITION

Directs the controller to reset the partition flag bits on all devices in a container and establishes the container as a non-partitioned container. This command can only be used with RAIDset containers.

Caution: Ensure that the container was previously initiated as a non-partitioned container before using this command. Failure to do so results in loss of access to any partitioned data.

Note: Issuing the *SPECIAL_FUNCTION_ONE=PARTITION* or the *SPECIAL_FUNCTION_ONE=NOPARTITION* switch in dual-redundant controller configurations causes the container ownership to move to the controller from which the `REINITIALIZE` *container-name* command was *not* issued.

TURNSAVEOFF

Alters metadata in a storageset devices to indicate that the controller is not to perform save configuration updates to these devices.

Note: After the *TURNSAVEOFF* switch is disabled, the bit cannot be reset without initializing the storageset.

Tip: Using the *TURNSAVEOFF* switch is a definitive method for disabling save configuration operations to devices that were initialized under older ACS versions. This switch does not become effective if a storage container is moved or placed under a controller running ACS versions prior to V8.8.

Example

```
HSG_TOP> REINITIALIZE R1 SPECIAL_FUNCTION_ONE=INFO


Unit: D7, Type: Un-partitioned

Raidset: R1

Device: DISK10200, Marked partitioned: No,  Structure version
Affected: No,  mdata_version (vsi): 11

Device: DISK30200, Marked partitioned: No,  Structure version
Affected: No,  mdata_version (vsi): 11

Device: DISK20200, Marked partitioned: Yes, Structure version
Affected: Yes, mdata_version (vsi): 11
```

Figure 5: Screen display after issuing the REINITIALIZE SPECIAL_FUNCTION_ONE=INFO command

See Also

CONFIGURATION SAVE
INITIALIZE

RENAME

Renames a specified container or specified host connection.

Note: Units, remote copy sets, and association sets cannot be renamed.

Syntax

`RENAME` *`old-container-name new-container-name`*

Parameters

The following parameters support the `RENAME` command:

- *`old-container-name`*
- *`new-container-name`*

These parameters are described in the following paragraphs.

old-container-name

Specifies the existing name of the container or host connection.

new-container-name

Assigns the new name for the container or host connection.

A name of a host connection can be any combination of letters and numbers, with the one restriction that it cannot take the form of the default assigned by the controller (`!NEWCON`*`nn`*).

Switches

There are no switches associated with this command.

Example

To change the name of DISK10000 to MYDISK, enter:

```
RENAME DISK10000 MYDISK
```

To change the name of host connection !NEWCON03 to server2, enter:

```
RENAME !NEWCON03 SERVER2
```

RESTART *controller*

Flushes all user data from the writeback cache of the specified controller and restarts the controller.

Syntax

`RESTART` *`controller`*

Parameters

The following parameter supports the `RESTART` command:

controller

Identifies which controller is to receive the `RESTART` command. You must specify `THIS_CONTROLLER` (the one connected to the CLI maintenance terminal) or `OTHER_CONTROLLER`.

Switches

The following switches support the `RESTART` *`controller`* command:

- *`IGNORE_ERRORS`* and *`NOIGNORE_ERRORS`*
- *`IMMEDIATE_SHUTDOWN`* and *`NOIMMEDIATE_SHUTDOWN`*

These switches are described in the following paragraphs.

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

Controls the reaction of the controller, based on the status of writeback cache.

Caution: The *`IGNORE_ERRORS`* switch can cause the controller to keep unflushed data in the writeback cache until it restarts and is able to write the data to devices. Do not perform any hardware changes until the controller flushes the cache.

- Specify *IGNORE_ERRORS* to instruct the controller to restart even if the data within writeback cache cannot be written to the devices.
- Specify *NOIGNORE_ERRORS* to instruct the controller to not restart if the data within writeback cache cannot be written to the devices.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (default)

Instructs the controller when to shut down and whether to flush the writeback cache or not.

Caution: The *IMMEDIATE_SHUTDOWN* switch instructs the controller to immediately shut down without regard to any data contained within writeback cache. Do not perform any hardware changes until the controller flushes the cache.

- Specify *IMMEDIATE_SHUTDOWN* to instruct the controller to restart immediately without flushing data from the writeback cache to devices.
- Specify *NOIMMEDIATE_SHUTDOWN* to instruct the controller not to restart before all data is flushed from writeback cache to the devices.

Examples

To restart “this controller,” enter:

```
RESTART THIS_CONTROLLER
```

To restart “other controller,” enter:

```
RESTART OTHER_CONTROLLER
```

See Also

SELFTEST
SHUTDOWN *controller*

RETRY_ERRORS *unit-number* UNWRITEABLE_DATA

Causes the controller to attempt to write previously unwriteable data from the writeback cache to the specified devices. No data is lost if the retry fails.

If a container fails in a way that prevents the data in writeback cache to be written to the container, an unwriteable data error is reported.

Syntax

`RETRY_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`

Parameter

The following parameter supports the `RETRY_ERRORS` command:

unit-number

Identifies the unit number to which the data contained in writeback cache tries to write. The unit number is the same name given to the unit after it was created using the `ADD UNITS` command.

Switches

There are no switches associated with this command.

Example

To retry the writing of the cached data previously marked `unwriteable to disk unit D103`, enter:

```
RETRY_ERRORS D103 UNWRITEABLE_DATA
```

See Also

`CLEAR_ERRORS` *`unit-number`* `UNWRITEABLE_DATA`

RUN

Runs the specified diagnostic or utility program on "this controller."

Syntax

```
RUN program-name
```

Parameter

The following parameter supports the `RUN` command:

program-name

Specifies the name of the diagnostic or utility program to be run. The following programs can currently be run:

- *CHVSN*—This is not a user utility. This utility is used by HP authorized service providers only.
- *CLCP*—A utility used to load updated software or patches.
- *CLI (Command Line Interface)*—A utility that allows the entry of the CLI commands into the controller.
- *CLONE*—A utility used to automate the process of mirroring units to create a snapshot copy of host unit data.
- *CLONEW*—A utility used in the same manner as the *CLONE* utility, except that it uses the linked WWID associated with the source unit instead of allocating a new one.
- *CONFIG*—A utility used to locate and add devices to the controller configuration. The *CONFIG* utility can be run anytime new devices are added to the subsystem.
- *DILX*—A utility used to test and verify the controller operation with attached storage devices under a high or low I/O load. Run *DILX* (Disk Inline Exerciser) only if there is no activity on the controller. The total I/O load is handled by the controller, bypassing the host.

  The *DILX* utility has two modes: Autoconfigure mode and Standard mode.

Caution: Run the *DILX* utility in the Autoconfigure mode only at initial installations. If write operations are enabled, the *DILX* utility may overwrite existing data.

The Autoconfigure mode is the most thorough mode and allows you to:

— Automatically test all of the disk units configured.

— Automatically perform thorough tests on all units with write operations enabled.

The Standard mode is more flexible and allows you to:

— Test selected disks.

— Perform tests in Read-only mode or Write-only mode.

— Provide run time and performance summary option.

— Run in Read-only mode.

- *DIRECT*—A command used to display a list of all executable diagnostic or utility programs.
- *DSTAT*—This is not a user utility. This utility is used by HP authorized service providers only.
- *DWNGRD*—This is not a user utility. This utility is used by HP authorized service providers only.
- *FMU (Fault Management Utility)*—A utility used to control several spontaneous errors. *FMU* also displays information regarding the most recent controller and memory system failure.
- *FRUTIL (Field Replacement Utility)*—A utility used if you are replacing a failed controller, external cache battery, or cache module.
- *HSUTIL*—A utility used to format a disk device or to download new firmware to a tape or disk device.
- *VTDPY (Virtual Terminal Display)*—A utility used to display the current controller state, performance data, processor utilization, host post activity and status, device state, logical unit state, cache performance, and I/O performance.

Refer to the controller troubleshooting guide for more information regarding these utilities.

Switches

There are no switches associated with this command.

Example

To start the *DILX* diagnostic program, enter:

```
RUN DILX
```

See Also

DIRECTORY

SELFTEST

Flushes the data from the specified controller writeback cache (if present) and shuts down the controller. It then restarts the controller in looping Self-test mode. Press the controller **Reset** button to take the controller out of Self-test mode.

Syntax

`SELFTEST` *`controller`*

Parameters

The following parameter supports the `SELFTEST` command:

controller

Identifies which controller is to perform the `SELFTEST` *`controller`* command. You must specify `THIS_CONTROLLER` (the one connected to the CLI maintenance terminal) or `OTHER_CONTROLLER`.

Switches

The following switches support the `SELFTEST` *`controller`* command:

- *`IGNORE_ERRORS`* and *`NOIGNORE_ERRORS`*
- *`IMMEDIATE_SHUTDOWN`* and *`NOIMMEDIATE_SHUTDOWN`*

These switches are described in the following paragraphs.

IGNORE_ERRORS
NOIGNORE_ERRORS *(default)*

Instructs the controller how to respond to writeback cache errors.

Caution: The *`IGNORE_ERRORS`* switch can cause data to remain in writeback cache. Do not perform any hardware changes until the controller flushes the cache.

- Specify *IGNORE_ERRORS* to instruct the controller to ignore any writeback cache errors. Such errors can result from data contained within writeback cache that cannot be written to devices or lost data errors.
- Specify *NOIGNORE_ERRORS* to instruct the controller not to run the self-test program if writeback cache errors are detected.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN *(default)*

Instructs the controller on whether to flush the writeback cache.

Caution: The *IMMEDIATE_SHUTDOWN* switch instructs the controller to immediately shut down, without regard to any data contained within writeback cache. Do not perform any hardware changes until the controller flushes the cache.

- Select *IMMEDIATE_SHUTDOWN* to instruct the controller to run the self-test program immediately without flushing user data from writeback cache to devices.
- Select *NOIMMEDIATE_SHUTDOWN* to instruct the controller to flush data from writeback cache before running the self-test program.

Examples

To start the self-test program on “this controller,” enter:

```
SELFTEST THIS_CONTROLLER
```

To run the self-test program on the “other controller,” even if the “other controller” cannot flush all data from the writeback cache, enter:

```
SELFTEST OTHER_CONTROLLER IGNORE_ERRORS
```

See Also

RESTART *controller*
SHUTDOWN *controller*

SET *association-set-name*

Changes the characteristics of an association set.

Note: This command works only in a DRM environment and requires an HSG80 controller with ACS V8.8-*x*P. Like all DRM commands, use of this command is heavily restricted. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for examples of usage.

Syntax

`SET` *`association-set-name`*

Note: Only one characteristic of an association set can be changed at any one time; therefore, only one switch at a time can be specified with any `SET` *`association-set-name`* command.

Parameters

The following parameter is associated with this `SET` command:

association-set-name

Identifies the name of the association set whose characteristics are to be changed.

Switches

The following switches support the `SET` *`association-set-name`* command:

- *ADD*
- *FAIL_ALL* and *NOFAIL_ALL*
- *LOG_UNIT* and *NOLOG_UNIT*

- *ORDER_ALL* and *NOORDER_ALL*
- *REMOVE*

These switches are described in the following paragraphs.

ADD=remote-copy-set-name

Adds the specified remote copy set to the association set.

FAIL_ALL
NOFAIL_ALL

Determines the failsafe lock operation of members of the association set. (Failsafe lock is a condition a remote copy set assumes under certain potentially catastrophic error conditions. The failsafe locked condition prevents further write operations from the host to the remote copy set members.)

- Specify *FAIL_ALL* to cause all the members of the association set to assume the same failsafe lock condition if they are in Failsafe Error mode. Failsafe lock is enabled by the *ERROR_MODE* switch of the SET *association-set-name* command. If one member of the association set becomes failsafe locked, any association set member that has failsafe lock enabled also becomes failsafe locked.
- Specify *NOFAIL_ALL* to cause the members of the association set to react independently of the failsafe lock conditions. One member of the association set becoming failsafe locked has no effect on the other members of the association set.

This switch has no effect if all members of the association set have failsafe lock disabled (Normal Error mode).

LOG_UNIT=unit-name
NOLOG_UNIT

Determines whether an association set is assigned a dedicated log unit.

- Specify *LOG_UNIT* to assign a dedicated log unit for the association set. Should the initiator become unable to access the target, the unit specified by *unit-name* logs a history of write commands from the host. If the target becomes accessible, the initiator can read the log disk and can send the write commands, in order, to the target, which brings the target into congruency with the initiator.

Caution: After the command is entered, a header is immediately written to the log unit, which can make it difficult or impossible to recover any user data previously written on the unit. Care should be taken in specifying which unit should be the log unit.

The log unit must be either a mirrorset or a striped mirrorset. It cannot be a partitioned unit. The log unit must reside at the initiator site and cannot be moved to the target site. In addition, it must have the following characteristics:

— Writeback caching disabled

— Access disabled

— Other unit settings at default

This switch is valid only if all members of the association set are in Normal (not Failsafe) Error mode. Error mode is determined by the `ERROR_MODE` switch of the `SET association-set-name` command.

- Specify `NOLOG_UNIT` to deassign the log unit.

ORDER_ALL NOORDER_ALL

Determines how write operations are carried out for association sets.

- Specify `ORDER_ALL` to create the following outcome:
  - — If one member of the association set is defaulted with write history logging, all members of the association set start logging write operation history.
  - — The order of all asynchronous write operations across all members of the association set is preserved.
- Specify `NOORDER_ALL` to create the following outcome:
  - — Members of the association set start to log (or not) independently.
  - — The order of all asynchronous write operations across all members of the association set is not preserved.

This switch cannot be changed if a log unit is assigned to the association set. The log unit must be removed, then the order switch changed, then the log unit must be reassigned. The order switch goes into effect if the log unit is assigned.

REMOVE

Removes an existing association set.

Examples

To add remote copy sets RCS2 and RCS4 to association set AS3, enter:

```
SET AS3 ADD=RCS2
SET AS3 ADD=RCS4
```

See Also

ADD ASSOCIATIONS
ADD REMOTE_COPY_SETS
SET *remote-copy-set-name*

SET *concatset-name*

Expands an existing unit by concatenating another storageset of the same type to the storageset that constitutes the unit.

Note: The maximum size of a concatset is 1.024 TB.

Caution: Executed this command only with host operating systems that can support dynamic volume expansion. This command is not supported on IBM AIX and Novell Netware operating systems. If the operating system cannot handle the expansion of one of its disks, use of this command could make data inaccessible.

This command is subject to the following restrictions:

- Both storagesets must be of the same type.
- If either member storageset becomes inoperative, the concatset becomes inoperative. However, a reduced RAIDset does not make the concatset inoperative.
- Mirrorsets cannot be used.
- Partitions cannot be used.
- Concatsets cannot be partitioned.
- The maximum total disks in a concatset is 24.
- Storagesets must have been initialized before being added to the concatset.
- The *CLONE* utility cannot be used on a concatset.
- Concatsets cannot be used in remote copy sets.

Syntax

```
SET concatset-name
```

Parameters

The following parameter is associated with this `SET` command:

concatset-name

Identifies the name of the concatset to be expanded.

Switches

The following switch supports the `SET` *`concatset-name`* command:

ADD=storage-set-name

Concatenates the storageset specified by *`storage-set-name`* to the concatset.

Examples

To expand the capacity of unit D0 which consists of stripeset Stripe1, by adding another stripeset (Stripe2), enter:

```
ADD CONCATSETS C1 STRIPE1
SET C1 ADD=STRIPE2
```

See Also

`ADD CONCATSETS`
`DELETE` *`concatset-name`*
`SHOW CONCATSETS`

SET *connection-name*

Changes the operating characteristics of a host connection. Each path between a Fibre Channel adapter in a host computer and an active host port on a controller is a connection.

This command adds the specified host connection to the table of known connections. This table is maintained in the controller's memory. The maximum table length is 96 connections; if the table contains 96 entries, new connections cannot be added unless some old ones are deleted.

The `SET` *`connection-name`* command changes the operating parameters of the specified host connection. A host connection is a specific instance of one host connected to one port of one controller through one host adapter.

Syntax

`SET` *`connection-name`*

Parameters

The following parameter is associated with this `SET` command:

connection-name

Identifies the name of the host connection. If a new host-adapter-port-controller connection is made, the new connection is given a default connection name. The default connection name is `!NEWCON`*`nn`*, where *`nn`* is a decimal number. The connection name can be changed through the `RENAME` command.

Switches

The following switches support the `SET` *`connection-name`* command:

- *`OPERATING_SYSTEM`*
- *`RESERVATION_STYLE`*
- *`UNIT_OFFSET`*

These switches are described in the following paragraphs.

OPERATING_SYSTEM=OS_name

Specifies the operating system of the host. The *OPERATING_SYSTEM* switch tailors the controller's behavior for use with a particular operating system. Refer to your operating system specific OS solution software kit to determine which value should be used. The following values are supported:

- HP
- IBM
- NETWARE
- SGI
- SNI
- SUN
- TRU64_UNIX
- VMS
- WINNT
- AIX_CAMBEX
- HP_VSA

RESERVATION_STYLE=CONNECTION_BASED (default)
RESERVATION_STYLE=HBA_PORT_ID_BASED

Selection of a reservation style should be based upon the capabilities of the host operating system. Refer to the OS solution software kit for more details. SCSI persistent reservations are processed differently by the HSG60 and HSG80 based upon the reservation style. Normal SCSI reservations (not persistent) are always treated as *CONNECTION_BASED*.

- Specify *HBA_PORT_ID_BASED* to propagate a single persistent reservation command to all HSG60 and HSG80 controller ports; thereby, enabling the host to access the unit over any available path.
- Specify *CONNNECTION_BASED* to allow the persistent reservation to be only valid for the port on which it is received; thereby, limiting the host access to those paths that are explicitly reserved.

Note: If a particular host prefers either the *CONNECTION_BASED* or *HBA_PORT_ID_BASED* reservation style, all the connections to that particular host must have identical reservation style settings.

The most important advantage of this mechanism is allowing various hosts, with different reservation style requirements, to be connected to the same HSG60 and HSG80 controllers in a SAN environment.

UNIT_OFFSET

Establishes the beginning of the range of units that a host connection can access. It is expressed as a decimal value (and is usually just called *offset*). It defines and restricts host connection access to a contiguous group of unit numbers.

If no value is specified for the *UNIT_OFFSET* switch, then host connections have default offsets as follows:

- In Transparent Failover mode, connections on port 1 have an offset of 0 and connections on port 2 have an offset of 100.
- In Multiple-bus Failover mode, all connections have an offset of 0.

The relationship between LUN number, unit number, and offset is as follows:

- LUN = unit-number – offset
- Logical unit-number (LUN) = the logical unit-number presented to the host connection
- Unit-number = the number assigned to the unit in the `ADD UNITS` command. This is the number by which the unit is known internally to the controllers.

Example

```
set !newcon31 operating_system=vms unit_offset=20
```

See Also

`ADD CONNECTIONS`
`SHOW CONNECTIONS`
`DELETE` *`connection-name`*
`RENAME`

SET *controller*

Changes specified switch values on the specified controller.

Note: After submitting the `SET controller` command to either controller, use a `SHOW THIS_CONTROLLER` and a `SHOW OTHER_CONTROLLER` command to verify that changes went into effect.

Syntax

`SET controller`

Parameter

The following parameter is associated with this `SET` command:

controller

Identifies which controller is to be set. Specify `THIS_CONTROLLER` (the one connected to the CLI maintenance terminal) or `OTHER_CONTROLLER`.

"This controller" indicates the controller that is connected to the maintenance terminal while executing CLI commands. "Other controller" is the controller not connected to the maintenance terminal in dual-redundant controller configurations.

Switches

Table 6 lists the switches available with this command. Descriptions of the switches follow the table.

Table 6: SET *controller* Switches

Switch	Value
ALLOCATION_CLASS	0-4,294,967,295, 0 *(default)*
CACHE_FLUSH_TIMER=n	1-65,535, 10 *(default)*
COMMAND_CONSOLE_LUN *NOCOMMAND_CONSOLE_LUN*	None

Table 6: SET *controller* Switches (Continued)

Switch	Value
CONNECTIONS_LOCKED *CONNECTIONS_UNLOCKED*	None
DEFAULT_ACCESS=DISABLE_ALL *DEFAULT_ACCESS=ENABLE_ALL*	Disable Enable
INDENTIFIER=n *NOIDENTIFIER*	1-9,999
MIRRORED_CACHE *NOMIRRORED_CACHE*	None
NODE_ID	*nnn-nnnn-nnnn-nnnn xx*
PORT_1_AL_PA=n *PORT_2_AL_PA=n*	0-EF (hexidecimal); factory defaults: port 1 is 71 and port 2 is 72
PORT_1_TOPOLOGY=FABRIC *PORT_2_TOPOLOGY=FABRIC*	None
PORT_1_TOPOLOGY=LOOP_HARD *PORT_1_TOPOLOGY=LOOP_SOFT* *PORT_1_TOPOLOGY=OFFLINE* *PORT_2_TOPOLOGY=LOOP_HARD* *PORT_2_TOPOLOGY=LOOP_SOFT* *PORT_2_TOPOLOGY=OFFLINE*	None
PROMPT="new prompt"	1-16 characters
REMOTE_COPY=node-name *NOREMOTE_COPY*	None
SCSI_FAIRNESS	Disable Enable
SCSI_VERSION=SCSI-2 *SCSI_VERSION=SCSI-3*	None
SMART_ERROR_EJECT	Disable Enable
TERMINAL_PARITY *NOTERMINAL_PARITY*	Odd or even, no terminal parity *(default)*

Table 6: SET *controller* Switches (Continued)

Switch	Value
TERMINAL_SPEED	4,800, 9,600 *(default)*, or 19,200
TIME	Two-digit day, three-character month, four-digit year, and two-digit hour, minute, and second
UPS=NODE_ONLY *UPS=DATACENTER_WIDE* *NOUPS*	None

ALLOCATION_CLASS

Allocation class is a unique identification number assigned to the controller pair under certain operating systems. The value for an allocation class is 0-4,294,967,295; for Tru64 UNIX®, it is a 4-byte number. It is reported in response to the SCSI inquiry command and is the same for all units connected to one or both controllers. The allocation class value allows the host to identify the controllers that are a matched dual-redundant pair. This number should be unique for every pair of dual-redundant controllers in the cluster.

Note: This value must not be zero *(default)* in dual-redundant configurations for host systems that implement allocation class. A zero value in this configuration causes the operating system to disable failover between the controller pair. Some operating systems do not implement allocation class, in which case the default of zero has no meaning.

CACHE_FLUSH_TIMER=n
CACHE_FLUSH_TIMER=10 (default)

Specifies how many seconds (1–65,535) of idle time elapses on a unit before the writeback cache flushes its entire contents to the disks of this idle unit. The default setting is 10 seconds. If changed, the new value entered for this switch takes effect immediately.

COMMAND_CONSOLE_LUN
NOCOMMAND_CONSOLE_LUN

Enables or disables the command console LUN (CCL), a communication LUN used to initially setup SWCC. If changed, the new setting for this switch takes effect immediately.

This switch works in SCSI-2 mode only. This switch has no effect in SCSI-3 mode. SCSI mode is set by the *SCSI_MODE* switch of this command.

- Select *COMMAND_CONSOLE_LUN* to enable the CCL.
- Select *NOCOMMAND_CONSOLE_LUN* to disable the CCL.

If all LUNs have already been allocated and you attempt to enable the CLL, the following message displays:

```
Error 1230: Command console LUN can't be enabled
because all LUNs are allocated.
```

CONNECTIONS_LOCKED
CONNECTIONS_UNLOCKED (default)

Controls access to the connection table maintained in NonVolatile RAM (NVRAM). If the table is locked, the host login request (PLOGI) is rejected (unless the connection is already in the table) and the request is stored internally in a rejected hosts table. If a login request is received while the connection table is unlocked, the connection is granted if there is room in the connection table.

- Enter `CLI> SET <THIS | OTHER> CONNECTIONS_LOCKED` to lock the table.
- Enter `CLI> SET <THIS | OTHER> CONNECTIONS_UNLOCKED` to unlock the table.

Note: The *CONNECTIONS_LOCKED* and *CONNECTIONS_UNLOCKED* switches must be typed completely to prevent inadvertently changing the state of the lock.

Note: The `ADD CONNECTIONS` command is not affected by the state of the lock.

DEFAULT_ACCESS=ENABLE (default)
DEFAULT_ACCESS=DISABLE

Specifies whether newly added units automatically allow connections between host computers and the controller.

Controls whether newly added units can automatically allow connections between a Fibre Channel adapter in a host computer and an active host port on a controller.

Note: The default controller behavior of enabling all connections is retained after ACS V8.8-*x* is installed to maintain compatibility with user scripts.

With this command, both controllers have the same setting and the setting does not change after a controller reboot.

Note: Although the HP StorageWorks HSG Element Manager and HP StorageWorks Command Console disable all connections for units created through their respective programs, creating new units through the CLI requires you to manually disable connections unless you set the default access setting to *DISABLE_ALL*.

IDENTIFIER=n
NOIDENTIFIER

Determines how the command console LUN (CCL) is identified by the host operating system.

- Specify *IDENTIFIER* to provide an alternative way (other than a World Wide Name) for some operating systems to identify the command console LUN (CCL).
- Specify *IDENTIFIER* with the *SCSI_VERSION* switch if the SCSI version is set to SCSI-3 mode. The *IDENTIFIER* switch creates a *CCL identifier* that makes the controller and the CCL visible to the host. This number can be a value between 1–9,999.

Tip: OpenVMS configures DGA units based on the identifier value that is presented from the controller. You cannot present multiple units from the controller with the same identifier to a single OpenVMS node or single OpenVMS cluster; otherwise, unpredicable mounting results occur.

MIRRORED_CACHE
NOMIRRORED_CACHE

Caution: *Before* invoking the `MIRRORED_CACHE` or `NONMIRRORED_CACHE` command, carefully read the following information to avoid damaging data or the subsystem.

Enables the mirrored writeback data cache feature on dual-redundant controllers. If changed, both controllers restart for the new switch setting to take effect.

The following tasks are performed if the `NOMIRRORED_CACHE` switch is specified:

- Data in writeback cache is flushed if cache is configured in Nonmirrored mode.
- Mirrored writeback cache on both controllers is enabled.
- If an invalid cache configuration exists within the cache modules, an error is generated.
- Persistent reservations for all units are lost after you change the mirrored cache setting.

Note: Both controllers must be operational before this command is accepted.

Issue this switch through only one controller. The controllers must have a valid cache configuration before specifying this switch. The controllers automatically restart if this switch is specified.

Note: All unwritten write-cached data is automatically flushed from the cache before restart if the `MIRRORED_CACHE` switch is specified. Depending on the amount of data to be flushed, this command can take several minutes to complete before the controller is restarted.

The `NOMIRRORED_CACHE` switch disables Mirror mode. Data in writeback cache is flushed if this switch is entered from Mirrored mode. This switch disables mirrored writeback cache on both controllers. Therefore, this switch

is only to be issued through one controller. The controller must contain a valid cache configuration before this switch is assigned. Unlike going from Nonmirrored mode to Mirrored mode, going from Mirrored mode to Nonmirrored mode is permitted with a failed cache module. The controller automatically restarts if this switch is specified.

Modifying the *MIRRORED_CACHE* setting while the system is running requires stringent attention. If the subsystem is connected to hosts that are running, you *must* carefully observe and monitor the CLI output directly after invoking this command.

After changing the operational mode for cache (*MIRRORED_CACHE* or *NOMIRRORED_CACHE*), a warning message is displayed:

```
Top>SET THIS NOMIRROR

Warning: Changing mirroring mode causes persistent
reservations to be lost. If there are units listed as having
persistent reservations in the following message, then
please use the command SET UNIT FAKE_PR so the host can clean
up the persistent reservations.

Unit D20 has a persistent reservation.
Unit D65 has a persistent reservation.
Unit D66 has a persistent reservation.
Unit D103 has a persistent reservation.
```

A list of units may be displayed that identifies which units, if any, have an active persistent reservation set within the cache. After this output is complete, the change in the mirrored cache configuration is made.

Since Tru64 UNIX host systems automatically assume that persistent reservations are never lost and array controllers automatically restructure cache data whenever its operational mode is changed, additional steps must be taken. First, you must associate any one unit with persistent reservations with each cluster. Then, you must enter the `SET` *unit FAKE_PR* command to restore persistent reservations that may have been lost. Lastly, you must execute any type of Tru64 UNIX host operation that results in a read to the physical unit associated to restore all persistent reservations. Doing this, causes Tru64 UNIX host systems to re-establish unit persistent reservation structures.

If, after examining displayed units, you discover that more than one node or cluster of nodes has units with persistent reservations on a unit, you must invoke the *FAKE_PR* switch against a unit for each different cluster or node.

If a unit is found that is *not* device-mounted by Tru64 UNIX, but another OS, then on each of those units invoke the `SET` *`unit FAKE_PR`* command against each unit. Other operating systems may not re-register their persistent reservation settings with the controller based upon a single units persistent reservation conflict.

NODE_ID=nnnn-nnnn-nnnn-nnnn xx

Sets the subsystem World Wide Name name (node ID).

- *`nnnn-nnnn-nnnn-nnnn`* is the node ID
- *`xx`* is the checksum

Caution: Each subsystem has its own unique WWN (node ID). If you attempt to set the subsystem WWN to a name other than the one that came with the subsystem, the data on the subsystem is not accessible. Never set two subsystems to the same WWN; data corruption occurs.

The subsystem WWN, which is a number, is a Fibre Channel convention. Every port has a unique 64-bit number, consisting of 16 hexidecimal (HEX) digits. Each HP StorageWorks Fibre Channel enclosure is assigned a node ID, which the controller pair in the enclosure assumes. The port IDs derive from the node ID. The node ID assigned to a enclosure never changes.

The node ID ends in a zero. An example of a node ID is 5000-1FE1-FF0C-EE00. The derivation of port IDs from the node ID is completed automatically by the controllers. The numerical value of the port IDs depends on the controller Failover mode.

In Transparent Failover mode, the port ID of port 1 for both controllers is the node ID plus 1, so in the above example, the port ID for port 1 would be 5000-1FE1-FF0C-EE01. Both controllers share this port ID for port 1 because in the Transparent Failover mode, only one port (port 1) on the controller is active at any time, and the other port 1 is on standby. Similarly, both controllers share a port ID for port 2, which is the node ID plus 2 (for example, 5000-1FE1-FF0C-EE02).

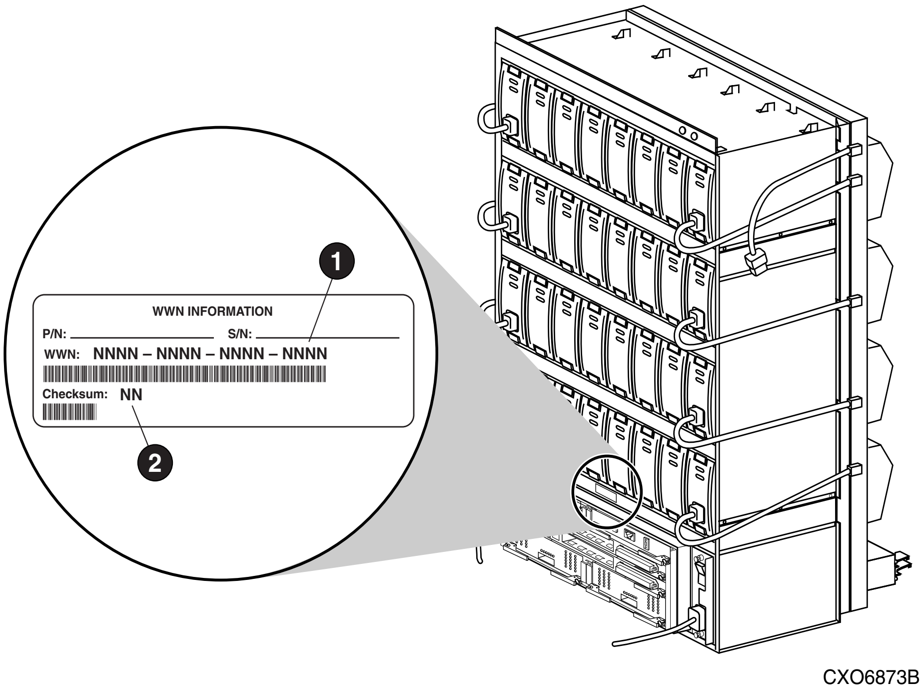
For a single configuration controller, the port ID is derived the same way (plus 1 for port 1, plus 2 for port 2).

In Multiple-bus Failover mode, all four ports are independent, and each has its own port ID. The port IDs are assigned as follows:

- Controller B port 1 = node ID + 1
- Controller B port 2 = node ID + 2
- Controller A port 1 = node ID + 3
- Controller A port 2 = node ID + 4

If one of the pair of controllers in a dual-redundant configuration is replaced, the remaining controller remembers the node ID. If the replacement controller is installed, the in-place controller copies the node ID to the replacement controller, and the replacement controller automatically assumes the correct port IDs.

If a situation occurs that requires the node ID to be reset, it can be done through the CLI by specifying the `NODE_ID` parameter in the `SET controller` command. The node ID *must* be reset to the number on the enclosure sticker. (The sticker calls it the WWN.) The sticker also contains a checksum, which verifies the ID number. If the node ID is entered, both controllers assume the correct port IDs automatically. Figure 6 on page 193 shows the location of the sticker.



❶ Node ID ❷ Checksum

Figure 6: Location of node ID sticker on a BA370 enclosure

PORT_1_AL_PA=n
PORT_2_AL_PA=n

Specifies the arbitrated loop physical address (AL-PA) for the host ports (used only in Fibre Channel arbitrated loop (FC-AL) topology). This switch works only if `LOOP_HARD` is specified for the `PORT_1_TOPOLOGY` or `PORT_2_TOPOLOGY` switch. The range of addresses allowed is 0-EF (hexadecimal).

The factory settings for AL-PA are 71 for port 1 and 72 for port 2. If the controller memory is wiped out, the AL-PA for both ports defaults to 69.

PORT_1_TOPOLOGY=FABRIC
PORT_2_TOPOLOGY=FABRIC

Specifies switch topology for a host port. This switch is used only in Fibre Channel switch (FC-SW) topology.

PORT_1_TOPOLOGY=LOOP_HARD
PORT_1_TOPOLOGY=LOOP_SOFT
PORT_1_TOPOLOGY=OFFLINE
PORT_2_TOPOLOGY=LOOP_HARD
PORT_2_TOPOLOGY=LOOP_SOFT
PORT_2_TOPOLOGY=OFFLINE

Indicates whether the user or controller selects the AL-PA for a host port, or whether the port is to be set offline (used only in AL-PA (FC-AL-PA) topology). *`LOOP_HARD`* allows you to pick the AL-PA. *`LOOP_SOFT`* requests the controller to pick the AL-PA. *`OFFLINE`* sets the host port offline. Specify *`OFFLINE`* for a port not in use.

Note: If a topology is already selected, topology must be set to offline before another topology is selected.

PROMPT="new prompt"

Specifies the alpha-numeric characters that are displayed if the ACS CLI prompts for input. This display (prompt) can be from 1-16 characters in length (only printable ASCII characters and spaces). The new prompt name must be enclosed within quotes. If changed, the new text entered for this switch takes effect immediately.

REMOTE_COPY=node-name
NOREMOTE_COPY

Determines whether a controller pair operates in Remove Copy mode.

Note: This command works in a remote copy environment and requires ACS V8.8-*x*P. Using either remote copy switch causes the controller to restart.

No other switch can be specified in the same command with the remote copy switches.

- Specify *REMOTE_COPY* to name a controller pair (node) and put the controller pair into Remote Copy mode. The node name can be up to eight characters long. It is suggested that the node name be something meaningful in the context of the DRM setup, such as the location, that distinguishes one controller pair from another.

Note: *Do not* use *local* and *remote* as node names. These are reserved as keywords.

All the other DRM commands are hidden until *REMOTE_COPY* is specified for the controller pair.

- Specify *NOREMOTE_COPY* to disable remote copy functionality for the controller pair. It also removes the node name given by the *REMOTE_COPY* switch. The switch does not work if there are any remote copy sets or remote copy connections associated with the controller pair.

SCSI_FAIRNESS=DISABLE (default)
SCSI_FAIRNESS=ENABLE

Caution: This command requires you to restart the controller after it is issued. The following message is displayed after the SET *controller SCSI FAIRNESS=ENABLED* command is issued:

```
Warning 4020: A restart of both this and the other controller
is required before all the parameters modified will take
effect
%CER--local_top> --19-JAN-2004 16:54:50-- Restart of this
controller required
%CER--local_top> --19-JAN-2004 16:54:50-- Restart of the
other controller required
Restart of this controller required Restart of the other
controller required
```

Allows the controller to identify all SCSI-3 disk devices and enable their fairness algorithm. For detailed information on fairness algorithms, refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide*.

Note: After submitting this command, a controller restart is required.

SCSI_VERSION=SCSI-2 (default) *SCSI_VERSION=SCSI-3*

Specifies the host protocol to use. SCSI-3 means that the controller uses some SCSI-3 commands. It does not mean that it is a fully-compliant SCSI-3 device. The CCL presents to the host a LUN through which it communicates with the controller.

A side effect of the SCSI mode is how the command console LUN (CCL) is handled.

- Specify *SCSI-2* to set the CCL as not fixed at a particular location, but floats depending on the configuration.
- Specify *SCSI-3* to set the CCL as fixed at LUN 0. The SCSI device-type returned to the host controller.

Changes to this switch take place at the next controller restart.

Note: In SCSI-2 mode, if the Command Console LUN (CCL) is enabled, and in SCSI-3 mode where the CCL is always enabled, the result is 127 visible LUNs and one CCL.

SMART_ERROR_EJECT=SMART ERROR EJECT

Removes drives in a normalized and redundant set that reports smart errors. Smart errors that are reported by drives in a nonredundant or non-normal set continue to handle this condition as a recovered error.

If the Smart Error Eject state is disabled, all smart errors are reported as recovered errors. The recovered error report contains ASC `0x5D`, the ASC for all smart errors, and the appropriate ASCQ. The default value for this feature is disabled.

Note: Configuration changes to disk drive SMART attributes support HP standards. SMART attributes events are only reported as recovered errors and will be reported to the host during normal I/O operations.

TERMINAL_PARITY=ODD
TERMINAL_PARITY=EVEN
NOTERMINAL_PARITY (*default*)

Specifies the parity with which data is transmitted and received. If changed, the new setting for this switch takes effect immediately.

TERMINAL_SPEED=baud-rate
TERMINAL_SPEED=9600 (*default*)

Sets the terminal transmission and reception speed (baud rate) to 4,800, 9,600 (default), or 19,200 baud. If changed, the new value entered for this switch takes effect immediately.

TIME=dd–mmm–yyyy:hh:mm:ss

Sets the date and time using a 24-hour clock. The time is set on both controllers in a dual-redundant configuration. If changed, the new value entered for this switch takes effect immediately.

UPS=NODE_ONLY
UPS=DATACENTER_WIDE
NOUPS

Specifies whether the controller should perform regular battery condition checks. Setting the `UPS` *or* *`NOUPS`* switch for either controller sets the switch for both controllers. Both controllers must be restarted in order for the new setting to take effect.

- Specify *`UPS=NODE_ONLY`* if the storage subsystem power is supplied by a separate uninterruptible power supply (UPS) directly connected to a power verification and addressing (PVA) module. If *`NODE_ONLY`* is specified the controller continues to check the condition of the cache batteries.

Caution: Setting *`UPS=NODE_ONLY`* or *`UPS=DATACENTER_WIDE`* without having a UPS or similar backup system in place can result in data loss if power is interrupted.

- Specify *UPS=DATACENTER_WIDE* if the whole room or building (not just the subsystem) is supported by a UPS. If *DATACENTER_WIDE* is specified, the controller does not check the condition of the cache batteries and ignores the battery state. This causes RAIDsets and mirrorsets to always be available, regardless of the condition of the cache batteries.
- Specify *NOUPS* to instruct the controller to perform regular cache battery checks and evaluate the condition of the cache batteries.

Examples

To change the “this controller” CLI prompt, enter:

```
SET THIS_CONTROLLER PROMPT=“TOP”
```

To change the “other controller” CLI prompt, enter:

```
SET OTHER_CONTROLLER PROMPT=“CONTROLLER B”
```

To set the name of the controller pair and put the controller pair in Remote Copy mode, enter:

```
SET THIS_CONTROLLER REMOTE_COPY=LONDON
```

Note: The “other controller” in the pair automatically receives the same name.

Figure 7 shows a sample screen display of the SMART Error Drive Eject setting.

```
AP_TOP> show this/full
Controller:
        HSG80 ZG02804912 Software V88S-0, Hardware  E12
        NODE_ID          = 5000-1FE1-FF00-0090
        ALLOCATION_CLASS = 1
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER with ZG02804288
            In dual-redundant configuration
        Device Port SCSI address 7
        Time: 22-MAY-2004 01:14:32
        Command Console LUN is lun 0 (IDENTIFIER = 99)
        Host Connection Table is NOT locked
        Smart Error Eject Disabled
```

Figure 7: Screen display showing the smart error eject setting

To enable SCSI fairness, enter:

```
AP_TOP> SET THIS SCSI_FAIRNESS=ENABLE
Controller:
HSG80 ZG94715677 Software V88P-1, Hardware  E10
        NODE_ID          = 5000-1FE1-0008-06D0
        ALLOCATION_CLASS = 0
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER with ZG12345678
            In dual-redundant configuration
        Device Port SCSI address 6
        Time: 19-JAN-2004 17:08:27
        Command Console LUN is lun 0 (NOIDENTIFIER)
        Host Connection Table is NOT locked
        Smart Error Eject Disabled
Host PORT_1:
        Reported PORT_ID = 5000-1FE1-0008-06D1
        PORT_1_TOPOLOGY  = FABRIC (fabric up)
        Address          = 031200
Host PORT_2:
        Reported PORT_ID = 5000-1FE1-0008-06D2
        PORT_2_TOPOLOGY  = FABRIC (fabric up)
        Address          = 031100
        REMOTE_COPY = LEFT
Cache:
        256 megabyte write cache, version 0022
        Cache is GOOD
        No unflushed data in cache
        CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
Mirrored Cache:
        256 megabyte write cache, version 0022
        Cache is GOOD
        No unflushed data in cache
```

```
Battery:
        NOUPS
        FULLY CHARGED
        Expires:             01-MAY-2005
Extended information:
       Terminal speed 9600 baud, eight bit, no parity, 1 stop bit
       Operation control: 00000000  Security state code: 60799
       Configuration backup disabled
       Unit Default access enabled
       SCSI Fairness Disabled
       Vendor ID: DEC
```

Figure 8 shows an example of how to disable SCSI fairness.

```
AP_TOP> SET THIS SCSI_FAIRNESS=DISABLE

Controller:

Warning 4020: A restart of both this and the other controller
is required before all the parameters modified will take
effect

%CER--local_top> --19-JAN-2004 16:54:50-- Restart of this
controller required

%CER--local_top> --19-JAN-2004 16:54:50-- Restart of the other
controller required

Restart of this controller required Restart of the other
controller required
```

Figure 8: Sample screen display showing how to disable the SCSI fairness setting

Figure 9 shows an example of how to enable the SMART error drive eject setting.

```
AP_TOP> show this
Controller:
        HSG80 ZG02804912 Software V88S-1, Hardware  E12
        NODE_ID          = 5000-1FE1-FF00-0090
        ALLOCATION_CLASS = 1
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER with ZG02804288
            In dual-redundant configuration
        Device Port SCSI address 7
        Time: 22-MAY-2004 01:17:47
        Command Console LUN is lun 0 (IDENTIFIER = 99)
        Host Connection Table is NOT locked
        Smart Error Eject Enabled
```

Figure 9: Sample screen display showing how to enable the SMART error drive eject setting

See Also

RESTART *controller*
SET MULTIBUS_FAILOVER
SHOW *controller*
SHUTDOWN *controller*
SHOW *controller*

SET *device-name*

Enables changes to the transfer rate and transportable characteristics of the specified disk drive.

Syntax

`SET device-name`

Parameter

The following parameter is associated with this `SET` command:

device-name

Specifies the name of the device to change, such as disk or passthrough device.

Switches

The following switches support the `SET device-name` command:

- *TRANSFER_RATE_REQUESTED*
- *TRANSPORTABLE and NOTRANSPORTABLE*

These switches are described in the following paragraphs.

- *TRANSFER_RATE_REQUESTED=ASYNCHRONOUS*
- *TRANSFER_RATE_REQUESTED=DEFAULT*
- *TRANSFER_RATE_REQUESTED=20MHZ (default and maximum setting for HP StorageWorks MA series cabinets)*
- *TRANSFER_RATE_REQUESTED=10MHZ (default and maximum setting for HP StorageWorks RA8000 series cabinets)*
- *TRANSFER_RATE_REQUESTED=5MHZ*

Specifies the maximum data transfer rate for the controller to use in communicating with the device.

Note: Limit the transfer rate to accommodate long cables between the controllers and the device.

Note: This switch is used by all container types.

TRANSPORTABLE NOTRANSPORTABLE

Indicates whether a disk can be accessed exclusively by controllers (the *TRANSPORTABLE* switch is used for disks only).

Note: This switch works only if the disk drive is not used by a higher level assembly, such as a storageset or a unit, and is used by disk containers only.

- Storagesets cannot be made transportable.
- Specify *NOTRANSPORTABLE* for all disks used in RAIDsets, stripesets, mirrorsets, and sparesets.
- Transportable disks do not contain any metadata or restricted areas on the disk. Therefore, transportable disks forfeit the advantage metadata provides.
- Transportable disks can be moved to a non HP StorageWorks environment with their data intact.
- If you specify the *NOTRANSPORTABLE* switch and there is no metadata on the unit, the unit must be initialized.
- If you specify *TRANSPORTABLE* for a disk that was originally initialized as a *NOTRANSPORTABLE*, you should initialize the disk.
- HP recommends that you avoid specifying *TRANSPORTABLE* unless transportability of the device or media is imperative, and there is no other way to accomplish moving the data. Examples:

To set the data transfer rate of DISK20000 to 5MHz, enter:

```
SET DISK20000 TRANSFER_RATE_REQUESTED=5MHZ
```

To set DISK10300 to transportable, enter:

```
SET DISK10300 TRANSPORTABLE
```

See Also

ADD DISKS
SHOW DEVICES
SHOW DISKS

SET DISABLE_MANAGERS

Provides the capability to revoke management rights from selected host connections. A manager is a host connection that is allowed to issue CLI commands through a LUN. By default all host connections are enabled as managers. This command has no effect on CLI commands issued through the maintenance port of the HSG80 array controller.

Note: This command has no effect on I/O operations. It only affects the ability of the host to issue CLI commands to the controller.

Note: After issuing `SET DISABLE_MANAGERS=ALL`, the controller only accepts CLI commands through the maintenance port. Commands from all other sources are rejected with a SCSI status of `ASC:91 ASCQ:08`.

Syntax

```
SET DISABLE_MANAGERS=ALL
SET DISABLE_MANAGERS=connection-names
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

To revoke the ability of host1 and host2 to issue CLI commands, enter:

```
SET DISABLE_MANAGERS=host1,host2
```

To revoke the ability of all hosts, except host1, to issue CLI commands, enter:

Note: The following commands must be issued through the maintenance port of the HSG60 or HSG80 array controller. Otherwise, all subsequent commands are rejected.

```
SET DISABLE_MANAGERS=ALL
SET ENABLE_MANAGERS=host1
```

An alternative way to perform the same functionality, without the restriction of using the maintenance port is by entering:

```
SET DISABLE_MANAGERS=host2,host3,host4,host5...
```

See Also

SET ENABLE_MANAGERS
SHOW MANAGERS

SET EMU

Sets operating parameters for the environmental monitoring unit (EMU) in a BA370 enclosure.

In subsystems with more than one BA370 enclosure, and therefore more than one EMU, the `SET EMU` command controls both the master and slave EMU settings. The EMU within the primary enclosure instructs the EMUs within the other enclosures to operate at the same settings as the master EMU.

Syntax

```
SET EMU
```

Parameters

There are no parameters associated with this command.

Switches

The following switches support the `SET EMU` command:

- *ALARM*
- *FANSPEED*
- *SENSOR_n_SETPOINT*

These switches are described in the following paragraphs.

ALARM=silent
ALARM=audible

Determines whether the audible alarm of the EMU sounds in the following cases:

- Drive failure
- Controller restart

The EMU alarm still sounds in the event of an adverse environmental condition, such as a power failure or an over-temperature condition.

FANSPEED=HIGH
FANSPEED=AUTOMATIC (*default*)

Sets the speed at which the fan operates.

- Select `FANSPEED=HIGH` to force the fans in all connected enclosures to operate at high speed continuously.
- Select `FANSPEED=AUTOMATIC` to allow the EMU to control the fan speed for the fans in all connected enclosures.

The EMU instructs the fans to operate at high speed if any of the temperature setpoints are exceeded or if one or more fans are not functioning. Refer to Table 7 on page 210 for additional information on setpoints.

SENSOR_1_SETPOINT=nn
SENSOR_2_SETPOINT=nn
SENSOR_3_SETPOINT=nn
SENSOR_x_SETPOINT=35 (*default*)

Sets the acceptable temperatures (in Celsius) at which the subsystem operates. Sensor 1 and Sensor 2 set the maximum operating temperature for the primary subsystem enclosure. Sensor 3 sets the maximum operating temperature for the EMU unit. The allowable range for the setpoint is 0°C (32°F) to 49°C (120°F). The EMU determines the default setpoint for all three sensors. Refer to Table 7 on page 210 for additional information on setpoints.

Table 7 lists the valid EMU set point temperatures in both Celsius and Fahrenheit.

Table 7: EMU Setpoint Temperatures

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
0	32	10	50	20	68	30	86	40	104
1	34	11	52	21	70	31	88	41	106
2	46	12	54	22	72	32	90	42	108
3	37	13	55	23	73	33	91	43	109
4	39	14	57	24	75	34	93	44	111
5	41	15	59	25	77	35	95	45	113
6	43	16	61	26	79	36	97	46	115
7	45	17	63	27	81	37	99	47	117
8	46	18	64	28	82	38	100	48	118
9	48	19	66	29	84	39	102	49	120

If any of the setpoints assigned to a secondary EMU do not match the corresponding setpoints assigned to the primary EMU, the secondary EMU settings change to match the corresponding primary EMU settings.

Refer to the enclosure documentation for detailed information about setting the EMU temperature set points.

Examples

This example shows how to set EMU sensor number 2 to 34°C:

```
SET EMU SENSOR_2_SETPOINT=34
```

This example shows how to set the EMU fan to operate at high speed:

```
SET EMU FANSPEED=HIGH
```

SET ENABLE_MANAGERS

Provides the capability to define a subset of host connections that have management rights. A manager is a host connection that is allowed to issue CLI commands through a LUN. By default all host connections are enabled as managers. This command has no effect on CLI commands issued through the maintenance port of the HSG80 array controller.

Note: This command has no effect on I/O operations. It only affects the ability of the host to issue CLI commands to the controller.

Syntax

```
SET ENABLE_MANAGERS=ALL
SET ENABLE_MANAGERS=connection-names
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

To accept only control commands from host connections !NEWCON00 and !NEWCON01, enter:

```
SET ENABLE_MANAGERS=!NEWCON00,!NEWCON01
```

See Also

SET DISABLE_MANAGERS
SHOW MANAGERS

SET FAILEDSET

Enables changes to the automatic replacement policy for the failedset.

Syntax

```
SET FAILEDSET
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SET FAILEDSET` command:

AUTOSPARE
NOAUTOSPARE

Specifies the policy to be used by the controller if a disk drive is physically replaced in the failedset.

- Specify *AUTOSPARE* to instruct the controller to automatically move devices physically replaced in the failedset into the spareset.
- Specify *NOAUTOSPARE* to instruct the controller to leave devices physically replaced in the failedset. The device, though replaced, remains in the failedset until it is manually removed with the `DELETE FAILEDSETS` command.

In most circumstances, a disk physically replaced into the failedset is functional and contains no metadata and is a new device that has not been initialized. If you specify the *AUTOSPARE* switch after a disk is physically replaced in the failedset, the controller checks to see if any metadata is present. If the controller detects metadata, the disk remains in the failedset. If the controller does not detect metadata, the controller automatically initializes the disk and moves it from the failedset to the spareset. Now a member of the spareset, the disk is available for any mirrorset or RAIDset requiring a replacement member. If the automatic initialization fails, the disk remains in the failedset.

Disks that you plan to use for *AUTOSPARE* must not have valid metadata on them. If you suspect a disk does have metadata on it (if it was used in a stripeset or was initialized as *NOTRANSPORTABLE*), you must use the following procedure to make the disk available as a spareset replacement disk (DISK10000 is used as an example):

1. Delete all containers to which the disk belongs.
2. Make the disk transportable:

   `SET DISK10000 TRANSPORTABLE.`
3. Initialize the disk:

   `INITIALIZE DISK10000`
4. Delete the disk:

   `DELETE DISK10000`
5. Add the disk to the spareset or remove disk from the enclosure.

Example

To enable the automatic spare feature, enter:

```
SET FAILEDSET AUTOSPARE
```

To disable the automatic spare feature, enter:

```
SET FAILEDSET NOAUTOSPARE
```

See Also

DELETE FAILEDSETS
SHOW FAILEDSETS

SET FAILOVER *COPY=controller*

Configures both controllers to operate in a dual-redundant configuration under Transparent Failover mode. This command allows both controllers to access the storage devices, providing controller fault-tolerant data processing. If one of the two controllers fail, the devices and any cache attached to the failed controller become available to and accessible through the other controller.

Note: Remove all connections that appear using the `SHOW CONNECTIONS` command before establishing Transparent Failover mode.

Note: Before putting the controllers in Failover mode, remove any previous mode with the `SET NOFAILOVER` command.

Syntax

`SET FAILOVER` *`COPY=controller`*

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SET FAILOVER` *`COPY=controller`* command:

COPY=controller

Identifies which controller contains the source subsystem configuration for the copy. You must specify *`THIS_CONTROLLER`* (the one connected to the CLI maintenance terminal) or *`OTHER_CONTROLLER`*. for the companion controller receiving the configuration information restarts after the command is executed.

Caution: Be sure you know which controller has the good configuration information before entering this command. The device configuration information from the controller specified by the controller parameter overwrites the information on the companion controller.

- Specify *THIS_CONTROLLER* to copy the device configuration information from “this controller” to “other controller.”
- Specify *OTHER_CONTROLLER* to copy the device configuration information from the “other controller” to “this controller.”

Due to the amount of information being passed from one controller to the other, this command can take up to two minutes to complete.

Example

To set the controllers in Transparent Failover mode and copy the configuration information from “this controller” to “other controller,” enter:

```
SET FAILOVER COPY=THIS_CONTROLLER
```

See Also

SET MULTIBUS_FAILOVER
SET NOFAILOVER
SET NOMULTIBUS_FAILOVER

SET *mirrorset-name*

Changes the characteristics of a mirrorset including the addition and removal of members.

Syntax

`SET mirrorset-name`

Parameter

The following parameter is associated with the `SET` command:

`mirrorset-name`

Specifies the name of the mirrorset to modify. This is the same name given to the mirrorset at the time it was created with the `ADD MIRRORSETS` command.

Switches

The following switches support the `SET` *`mirrorset-name`* command:

- *COPY*
- *MEMBERSHIP*
- *POLICY* and *NOPOLICY*
- *READ_SOURCE*
- *REMOVE*
- *REPLACE*

These switches are described in the following paragraphs.

COPY=FAST
COPY=NORMAL (default)

Sets the speed at which the controller copies data to a new member from normal mirrorset members, if data is being mirrored to the storageset disk drives.

- Specify *COPY=FAST* to allow the creation of mirrored data to take precedence over other controller operations. If you specify *COPY=FAST*, the controller uses more resources to create the mirrored data, and copying takes less time; however, overall controller performance is reduced.
- Specify *COPY=NORMAL* if operations performed by the controller should take priority over the copy operation. If you specify *COPY=NORMAL,* creating the mirrored data has a minimal impact on performance.

MEMBERSHIP=number-of-members

Sets the nominal number of mirrorset members to the number you specify for the *number-of-members* value. A maximum of six members can be specified.

Note: No other switches can be set after you specify the *MEMBERSHIP* switch.

If you increase the number of members, the controller automatically adds disk drives from the spareset to the mirrorset until the new number of members is reached, or there are no more suitable disk drives in the spareset.

If you increase the number of members and the *NOPOLICY* switch is specified, the *REPLACE=disk-name* switch must be specified to bring the mirrorset up to the new nominal number of members.

You cannot set the nominal number of members lower than the actual number of members. Specify the *REMOVE* switch to reduce the number of disk drives from the mirrorset.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Sets the selection criteria the controller uses to choose a replacement disk from the spareset if a mirrorset member fails.

- Specify *POLICY=BEST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the mirrorset was initialized). If there is more than one disk drive in the spareset that meet the criteria, the controller selects a disk drive with the best performance.

- Specify `POLICY=BEST_PERFORMANCE` to choose a replacement disk drive from the spareset with the best performance. The controller attempts to select a disk on a different port than existing mirrorset members. If there is more than one disk drive in the spareset matching the best performance criteria, the controller selects a disk drive that equals or exceeds the base member size of the mirrorset.
- Specify `NOPOLICY` to prevent the controller from automatically replacing a failed disk device. The mirrorset operates in a Reduced state until a `POLICY=BEST_FIT` or `POLICY=BEST_PERFORMANCE` is selected, or a member is manually placed in the mirrorset.

READ_SOURCE=disk-name
READ_SOURCE=LEAST_BUSY *(default)*
READ_SOURCE=ROUND_ROBIN

Selects the mirrorset member used by the controller to satisfy a read request.

- Specify `READ_SOURCE=disk-name` for a specific member to which you want the controller to direct all read requests. If the member fails out of the mirrorset, the controller selects the first normal member it finds to satisfy its read requests.
- Specify `READ_SOURCE=LEAST_BUSY` to direct read requests to the mirrorset member with the least amount of work in its queue. If multiple members have equally short queues, the controller queries these members for each read request as it would if `READ_SOURCE=ROUND_ROBIN` is specified.
- Specify `READ_SOURCE=ROUND_ROBIN` to sequentially direct read requests to each mirrorset member. The controller equally queries all normal members for each read request.

REMOVE=disk-name

Instructs the controller to remove a member from an existing mirrorset. The disk drive specified by `disk-name` is removed from the mirrorset specified by `mirrorset-name`. The removed disk drive is added to the failedset.

Note: No other switches can be set if the `REMOVE` switch is specified.

For each reduced mirrorset, there must be at least one remaining normal member after the reduction. A normal member is one whose contents are the same as the other members.

Unlike the `REDUCE` command, the *`REMOVE`* switch does not change the nominal number of members in the mirrorset. If the mirrorset has a replacement policy and there are acceptable disk drives in the spareset, the controller adds disk drives from the spareset to the mirrorset to make the actual number of members equal to the nominal number of members.

Note: Normalizing members exist only after you first create a mirrorset or after you clear lost data on a mirrored unit. The controller recognizes the member as normal, and all other original mirrorset members as *Normalizing*. New data that is written to the mirrorset is written to all members. The controller copies the existing data of the normal member before the mirrorset was created to the normalizing members. The controller recognizes the normalizing members as normal after all the blocks for the normalizing member are the same.

REPLACE=disk-name

Instructs the controller to add a disk member to an existing mirrorset if the following conditions are met.

- The replacement policy is set to *`NOPOLICY`*.
- The mirrorset is missing at least one member.

If these conditions are met, the disk drive specified by *`disk-name`* is added to the mirrorset specified by *`mirrorset-name`*. The nominal number of members does not change.

The disk name used is the name given to a disk as it was added to the configuration with the `ADD DISKS` command.

Note: Do not specify any other switches if the *`REPLACE`* switch is specified.

Examples

To change the replacement policy of mirrorset MIRR1 to best fit, enter:

```
SET MIRR1 POLICY=BEST_FIT
```

To remove member DISK30000 from mirrorset MIRR1 created above, enter:

```
SET MIRR1 REMOVE=DISK30000
```

Note: If the mirrorset has a replacement policy and an acceptable disk drive is in the spareset, the controller automatically adds the spare disk drive to the mirrorset.

To add disk DISK30200 to the mirrorset MIRR1 and immediately begin the copy operation onto DISK 30200, enter:

```
SET MIRR1 REPLACE=DISK30200
```

See Also

ADD MIRRORSETS
MIRROR
REDUCE
SHOW MIRRORSETS
SHOW *mirrorset-name*
UNMIRROR

SET MULTIBUS_FAILOVER

Places "this controller" and the "other controller" into Multiple-bus Failover mode. Failover is a process that allows a controller to take over total control of the storage subsystem in the event of the failure of its companion controller.

Note: Remove all connections that appear using the `SHOW CONNECTIONS` command before establishing Multibus Failover mode.

Note: Before putting the controllers in Multiple-bus Failover mode, remove any previous Transparent Failover mode with the `SET NOFAILOVER` command.

Syntax

`SET MULTIBUS_FAILOVER` *`COPY=controller`*

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SET MULTIBUS_FAILOVER` command:

COPY=controller

Identifies which controller contains the source configuration. You must specify *`THIS_CONTROLLER`* (the one connected to the CLI maintenance terminal) or *`OTHER_CONTROLLER`*. The companion controller receives the configuration information and restarts.

Caution: Verify which controller has the good configuration information before entering this command. The device configuration information from the controller specified by the *`controller`* parameter overwrites the information on the companion controller.

- Specify *THIS_CONTROLLER* to copy the device configuration information from the "this controller" to "other controller."
- Specify *OTHER_CONTROLLER* to copy the device configuration information from the "other controller" to "this controller."

Due to the amount of information being passed from one controller to the other, this command can take up to two minutes to complete.

Example

This example shows how to configure a controller pair to operate in Multiple-bus Failover mode:

```
SET MULTIBUS_FAILOVER COPY=THIS_CONTROLLER
```

The configuration on "this controller" is automatically copied to the "other controller" after you issue the `SET MULTIBUS_FAILOVER` command. If you want to set the preferred path of specific units to specific controllers, use the following command after setting multiple bus failover:

```
SET D100 PREFERRED_PATH=THIS_CONTROLLER
SET D101 PREFERRED_PATH=OTHER_CONTROLLER
```

See Also

SET NOFAILOVER
SET NOMULTIBUS_FAILOVER

SET NOFAILOVER

The SET NOFAILOVER and SET NOMULTIBUS_FAILOVER commands remove “this controller” and the “other controller” (if currently reachable) from Failover mode. Either command can be used to cancel failover, as they both perform exactly the same actions.

The controller on which the command was entered is always removed from the Dual-redundant mode, even if the second controller is not currently reachable. No configuration information is lost. All units that were accessed through the “other controller” fail over to “this controller,” and the “other controller” is shut down.

Note: Immediately after entering this command, one controller should be physically removed because the sharing of devices is not supported by single controller configurations.

HP recommends that both controllers be present while this command is submitted. Otherwise, the controllers become misconfigured with each other, requiring additional steps later to allow the “other controller” to be configured for failover.

The SET NOFAILOVER and SET NOMULTIBUS_FAILOVER commands affect both controllers, regardless of the controller on which the command is carried out.

Syntax

```
SET NOFAILOVER
```

or

```
SET NOMULTIBUS_FAILOVER
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SET NOFAILOVER` command:

DESTROY_UNFLUSHABLE_DATA
NODESTROY_UNFLUSHABLE_DATA (default)

Instructs the controller how to handle data contained within writeback cache. These switches have no effect if both controllers are operational. Select one of these switches to indicate how the controller is to handle data contained in cache if one of the controllers fails before it can properly shut down with the `SET NOFAILOVER`, `SET NOMULTIBUS_FAILOVER`, or `SHUTDOWN` *`controller`* commands.

Under some circumstances, the data in the writeback cache of a failed controller may not fail over to the writeback cache of the operating controller. For example, cache data does not fail over if the operating controller has a failed cache battery because of the risk of data loss if the power is interrupted.

- Specify *`NODESTROY_UNFLUSHABLE_DATA`* to leave the unwritten data intact in the writeback cache of the failed controller. After the failed controller is replaced and placed into service, the writeback cache data is flushed to the appropriate devices.
- Specify *`DESTROY_UNFLUSHABLE_DATA`* to reconfigure the operational controller before replacing the failed controller. The unwritten data of the failed controller can reference devices not present in the new configuration. If you do not destroy the old configuration data, it can conflict with the new configuration and cause the subsystem to behave unpredictably.

Caution: Unflushed data cannot be recovered after it is destroyed.

Example

To terminate Transparent Failover mode between two controllers in a dual-redundant configuration, enter:

```
SET NOFAILOVER
```

See Also

SET MULTIBUS_FAILOVER
SET NOMULTIBUS_FAILOVER

SET NOMULTIBUS_FAILOVER

See SET NOFAILOVER on page 223.

SET *RAIDset-name*

Changes the characteristics of the specified RAIDset.

Note: The number and type of disk drives that are used to create the storageset determine the maximum size of the RAIDset.

Syntax

`SET` *`RAIDset-name`*

Parameters

The following parameter is associated with the `SET` command:

RAIDset-name

Specifies the name of the RAIDset to modify. This is the name used with the `ADD UNITS` command to identify the RAIDset as a host-addressable unit.

Switches

The following switches support the `SET` *`RAIDset-name`* command:

- *`POLICY`* and *`NOPOLICY`*
- *`RECONSTRUCT`*
- *`REMOVE`*
- *`REPLACE`*

These switches are described in the following paragraphs.

POLICY=BEST_FIT
POLICY=BEST_PERFORMANCE (default)
NOPOLICY

Specifies the replacement policy to use if a member within the RAIDset fails.

- Specify *BPOLICY=EST_FIT* to choose a replacement disk drive from the spareset that equals or exceeds the base member size (smallest disk drive at the time the RAIDset was initialized). If more than one disk drive in the spareset is the correct size, the controller selects a disk drive with the best performance.
- Specify *POLICY=BEST_PERFORMANCE* to choose a replacement disk drive from the spareset resulting in the best performance of the RAIDset. The controller attempts to select a disk on a different port than existing members. If more than one disk drive in the spareset matches the best performance criteria, the controller selects the smallest disk drive that equals or exceeds the base member size of the RAIDset.
- Specify *NOPOLICY* to prevent the controller from automatically replacing a failed disk device. This causes the RAIDset to operate in a Reduced state until either *POLICY=BEST_PERFORMANCE* or *POLICY=BEST_FIT* is selected, or a member is manually replaced in the mirrorset.

RECONSTRUCT=FAST
RECONSTRUCT=NORMAL *(default)*

Sets the speed at which the controller reconstructs the data on the new RAIDset member replacing a failed member.

- Specify *RECONSTRUCT=NORMAL* to balance other controller operations against the reconstruct operation. The controller uses relatively few resources to perform the reconstruct, and there is little impact on performance.
- Specify *RECONSTRUCT=FAST* if the reconstruct operation must take precedence over other controller operations. The controller uses more resources to perform the reconstruction. Reconstruction takes less time, but overall controller performance is reduced during the reconstruction.

REMOVE=disk-name

Instructs the controller to remove a member from an existing RAIDset. The disk drive specified by *disk-name* is removed from the RAIDset specified by *RAIDset-name*. The removed disk drive is added to the failedset.

If a RAIDset is already in a Reduced state, an error is displayed and the command is rejected. If a replacement policy is specified, the replacement is taken from the spareset to replace the removed member using the policy specified.

If the *NOPOLICY* switch is specified with the SET *RAIDset-name* command, the RAIDset continues to operate in a Reduced state until a replacement policy is specified or the *REPLACE* switch is specified. See the *REPLACE=disk-name* switch for information on manually replacing a RAIDset member. See the *POLICY* and *NOPOLICY* switches on page 227 for information regarding setting a policy for automatic member replacement.

Note: Do not specify other switches if you use the *REMOVE* switch.

REPLACE=disk-name

Instructs the controller to add a disk member to an existing RAIDset if the following conditions are met:

- The replacement policy is set to *NOPOLICY*.
- The disk member is not in any configuration, including a spareset.

An error is displayed and the command is rejected if the RAIDset is not in a Reduced state, if a replacement policy is already specified, or if the disk specified is already being used by a configuration (including a spareset).

Note: Do not specify other switches after you invoke the *REPLACE* switch.

Examples

To change the replacement policy for RAIDset RAID9 to *BEST_FIT*, enter:

```
SET RAID9 POLICY=BEST_FIT
```

To remove member DISK10000 from the RAID9 RAIDset, enter:

```
SET RAID9 REMOVE=DISK10000
```

Note: If there is a replacement policy, the controller automatically moves a disk from the spareset to the RAIDset.

To add disk DISK20100 to the reduced RAIDset (RAID9) and immediately begin reconstruction on DISK20100, enter:

```
SET RAID9 REPLACE=DISK20100
```

See Also

`ADD RAIDSETS`
`SHOW RAIDSETS`
`SHOW` *`raidset-name`*

SET *remote-copy-set-name*

Changes the characteristics of a remote copy set.

Note: This command works only in a DRM environment and requires an HSG80 controller with ACS V8.8-*x*P. Like all DRM commands, use of this command is heavily restricted. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for examples of usage.

This command works only on the site that is functioning as initiator.

Syntax

`SET` *`remote-copy-set-name`*

Parameters

The following parameter is associated with the `SET` command:

remote-copy-set-name

Specifies the name of the remote copy set to modify. This is the name used with the `ADD REMOTE_COPY_SETS` command to identify the remote copy set as a host-addressable unit.

Switches

The following switches support the `SET` *`remote-copy-set-name`* command:

- *ADD*
- *ERROR_MODE*
- *INITIATOR*
- *OPERATION_MODE*
- *OUTSTANDING_IOS*
- *REMOVE*

- *RESUME*
- *SUSPEND*

These switches are described in the following paragraphs.

ADD=remote-node-name\target-unit-name

Specifies a unit to add into the remote copy set.

The *remote-node-name* is the name of the controller pair that controls the unit that is to be added. This name is assigned through the *REMOTE_COPY* switch of the SET *controller* command.

The *target-unit-name* is the name of the unit to be added to the remote copy set.

ERROR_MODE=FAILSAFE
ERROR_MODE=NORMAL (default)

Controls how and whether write operations occur on remote copy set members. Two options are available:

- Specify *ERROR_MODE=FAILSAFE* to enable Failsafe Lock mode for the members of the remote copy. Failsafe lock is a condition the members of the remote copy set assume under certain potentially catastrophic error conditions. The failsafe lock condition disables access to the remote copy set members.
- Specify *ERROR_MODE=NORMAL* to allow write operations to continue even if an error condition is present.

INITIATOR=initiator-unit-name

Moves the role of initiator to the specified target member.

Note: This command is part of the site failover procedure. Use of this switch is restricted to only site failover conditions. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for examples of usage.

OPERATION_MODE=SYNCHRONOUS *(default)* OPERATION_MODE=ASYNCHRONOUS

Determines which of two normal operating modes is assigned to the remote copy set.

- In Synchronous mode, write operations must be written to the target cache before the host is informed that the operation is complete. Synchronous operation assures data consistency among the members of a remote copy set.
- In Asynchronous mode, the write operation is reported as complete to the host before the data is written to the remote units of the remote copy set. Asynchronous mode provides greater performance and response time, but the data on all members of the remote copy set cannot be assumed to be always the same.

OUTSTANDING_IOS=n (1 to 240; default is 200)

Sets the number of outstanding I/O operations from the initiator to the target. The way this switch operates depends on which operating mode is set by the *OPERATION_MODE* switch:

- In Synchronous mode, *OUTSTANDING_IOS* refers to the number of remote writes (write operations from the initiator to the target) that can be outstanding.
- In Asynchronous mode, *OUTSTANDING_IOS* refers to the number of write operations that can be reported as completed to the host before they are written on all the members of the remote copy set.

REMOVE=remote-node-name/target-unit-name

Removes a unit from an existing remote copy set.

Remote-node-name is the name of the controller pair that controls the unit that is to be removed. This name is assigned through the *REMOTE_COPY* switch of the *SET controller* command.

Target-unit-name is the name of the unit to be removed from the remote copy set.

RESUME=remote-node-name/target-unit-name

Starts a recovery procedure called *mini-merge*. If the target becomes accessible, this switch enables the initiator to read the log disk and send the write commands, in order, to the target, which brings the target into congruency with the initiator.

A `SET` *`remote-copy-set-name`* command with the *`SUSPEND`* switch specified must have been entered before entering a `SET` *`remote-copy-set-name`* command with the *`RESUME`* switch specified.

SUSPEND=remote-node-name/target-unit-name

Allows suspension of write operations to the target so that the target can be used for backup, and then remote copy functionality can be resumed.

This switch starts the logging of write operations. If the target becomes accessible, entering a `SET` *`remote-copy-set-name`* command with the *`RESUME`* switch specified enables the initiator to read the log disk and send the write commands, in order, to the target, which brings the target into congruency with the initiator.

Examples

```
SET RCS7 ERROR_MODE=FAILSAFE
SET RCS7 OPERATION_MODE=SYNCHRONOUS
SET RCS7 OPERATION_MODE=ASYNCHRONOUS
SET RCS7 OUTSTANDING_IOS=240
```

See Also

`ADD REMOTE_COPY_SETS`
`SHOW REMOTE_COPY_SETS`
`SHOW` *`remote-copy-set-name`*

SET *unit-number*

Changes the characteristics of the specified logical unit.

Syntax

```
SET unit-number
```

Parameters

The following parameter is associated with the SET command:

unit-number

Specifies the logical unit number to modify. The *unit-number* is the name given to the unit at the time it was created using the ADD UNITS command.

Switches

Table 8 lists all switches for the SET *unit-number* command and shows which switches can be used with each type of device and storageset. Descriptions of the switches follow the table.

Table 8: SET *unit-number* Switches for Existing Containers

Switch / Container Type	RAIDset	Stripeset	Mirrorset	NOTransportable Disk	Transportable Disk
ENABLE_ACCESS_PATH *DISABLE_ACCESS_PATH*	✓	✓	✓	✓	✓
FAKE_PR	✓	✓	✓	✓	✓
IDENTIFIER *NOIDENTIFIER*	✓	✓	✓	✓	

Table 8: SET *unit-number* Switches for Existing Containers (Continued)

Switch / Container Type	RAIDset	Stripeset	Mirrorset	NOTransportable Disk	Transportable Disk
HOST_REDUNDANT *NOHOST_REDUNDANT*	✓	✓	✓	✓	✓
MAX_READ_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓
MAX_WRITE_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓
MAXIMUM_CACHED_TRANSFER_SIZE	✓	✓	✓	✓	✓
PREFERRED_PATH *NOPREFERRED_PATH*	✓	✓	✓	✓	✓
READ_CACHE *NOREAD_CACHE*	✓	✓	✓	✓	✓
READAHEAD_CACHE *NOREADAHEAD_CACHE*	✓	✓	✓	✓	✓
RUN *NORUN*	✓	✓	✓	✓	✓
WRITE_PROTECT *NOWRITE_PROTECT*	✓	✓	✓	✓	✓
WRITEBACK_CACHE *NOWRITEBACK_CACHE*	✓	✓	✓	✓	

ENABLE_ACCESS_PATH=connection-names
ENABLE_ACCESS_PATH=ALL (default)
DISABLE_ACCESS_PATH=connection-names
DISABLE_ACCESS_PATH=ALL

Specifies the access path. It can be a single specific host ID, multiple host IDs, or all host IDs (ALL). If multiple hosts exist on the same bus, use this switch to restrict hosts from accessing certain units. This switch limits visibility of specific units from certain hosts. For example, if two hosts are on the same bus, you can restrict each host to access only specific units.

Caution: If the storage subsystem has more than one host connection, the access path must be specified carefully to avoid giving undesirable host connections access to the unit. The default condition is that access paths to all host connections are enabled. To restrict host access to a set of host connections, specify *DISABLE_ACCESS_PATH=ALL* if the unit is added, then use the `SET` *unit-number* command to specify the set of host connections that are to have access to the unit.

Enabling the access path to a particular host connection does not override previously enabled access paths. All access paths previously enabled are still valid; the new host connection is simply added to the list of connections that can access the unit.

The procedure of restricting access by enabling all access paths and then disabling selected paths is particularly *not* recommended because of the potential data and security breach that occurs if a new host connection is added.

FAKE_PR

Note: Use the *FAKE_PR* switch for maintenance or recovery operations only.

If set on a unit, allows the controller to signal to host systems implementing persistent reservations that persistent reservations are lost. (Lost persistent reservations can occur as a result of mirrored cache reconfiguration or maintenance activities, such as cache module replacement.) After the *FAKE_PR* switch is invoked, the host may reset persistent reservations against all of its units in the storage system. After successful communication, the host recreates persistent reservations that were lost.

Host systems (such as Tru64 UNIX, V5.*x*) implementing persistent reservations assume that persistent reservations are never lost under any condition. Changing the mirrored cache setting causes persistent reservations to be lost by the controller because the controller reformats cache memory data structures where persistent reservation data for units reside. Tru64 UNIX re-establishes persistent reservations from the host master persistent reservation database.

For additional information, see *MIRRORED_CACHE* and *NOMIRRORED_CACHE* switch descriptions under the `SET` *`controller`* command on page 184.

HOST_REDUNDANT
NOHOST_REDUNDANT *(default)*

Modifies error handling for designated units so that the controller does not perform extensive errory recovery operations after receiving repeated `Not Ready` messages. The host is signalled with a `Unit Attention` and ASC and ASCQ of `04_03`, signifying that manual invention is required.

Note: This switch is especially pertinent for Tru64 UNIX, V5.*x* platforms. With Tru64 UNIX platforms using V5.*x*, ACS signals Logical Storage Manager (LSM) to disengage a unit from the host mirroring and to return the I/O to a good, redundant member.

- Specify *HOST_REDUNDANT* to turn on the capability to signal a host to move to the redundant unit copy for the original requested unit data if the controller is unable to submit data from the original unit to the host.
- Specify *NOHOST_REDUNDANT* to turn off the capability to signal a host to move to the redundant unit copy for the original requested unit data if the controller is unable to submit data from the original unit to the host.

Note: These switches cannot be used on units that are part of partitioned containers.

IDENTIFIER=n
NOIDENTIFIER *(default)*

Determines whether a unique identifier is to be assigned to a unit; thus, making it visible to the host.

- Specify *IDENTIFIER=n* to create a unique *unit identifier* that makes the unit visible to the host. This number can be a value from 0 to 32767.

Note: An identifier is required for OpenVMS operating systems to identify the unit.

- Specify *NOIDENTIFIER* to disallow the creation of a unique unit identifier.

MAX_READ_CACHED_TRANSFER_SIZE=n
MAX_READ_CACHED_TRANSFER_SIZE=32 *(default)*

Sets the largest number of read blocks to be cached by the controller. The controller does not cache any transfers over the size set. Acceptable values are from 0 to 2048.

The *MAXIMUM_CACHED_TRANSFER* switch affects both read and writeback cache if set on a controller that has read and writeback caching.

MAX_WRITE_CACHED_TRANSFER_SIZE=n
MAX_WRITE_CACHED_TRANSFE_SIZE=32 *(default)*

Sets the largest number of write blocks to be cached by the controller. The controller does not cache any transfers over the size set. Acceptable write block sizes are 0 through 2048.

The *MAXIMUM_CACHED_TRANSFER_SIZE* switch affects both read and writeback cache if set on a controller that has read and writeback caching.

MAXIMUM_CACHED_TRANSFER_SIZE=n
MAXIMUM_CACHED_TRANSFER_SIZE=32 *(default)*

Sets the largest number of read and write blocks to be cached by the controller. The controller does not cache any transfers over the set size. Acceptable read and write block sizes are 0 through 2048. The *MAXIMUM_CACHED_TRANSFER_SIZE* switch affects both read and writeback cache if set on a controller that has read and writeback caching. The

use of this switch has the effect of setting both the *MAX_READ_CACHED_TRANSFER_SIZE* and the *MAX_WRITE_CACHED_TRANSFER_SIZE* switches.

PREFERRED_PATH=OTHER_CONTROLLER
PREFERRED_PATH=THIS_CONTROLLER
NOPREFERRED_PATH (default)

Allows or disallows I/O load balancing. The *PREFERRED_PATH* switch allows you to balance the I/O load by specifying the controller through which the unit is accessed. If you set *NOPREFERRED_PATH* for a unit, it can be accessed through either controller.

Note: This command is only valid if in Multiple-bus Failover mode.

The controllers only use the *PREFERRED_PATH* setting if they are in a dual-redundant configuration. If one controller fails, all the devices are accessed through the remaining controller ignoring the *PREFERRED_PATH* setting.

If the failed controller is restarted, the drives automatically return to the controller specified by the *PREFERRED_PATH* switch.

You can specify the *PREFERRED_PATH* switch for a single controller configuration; however, the switch does not take effect until you add a second controller and configure the two controllers for dual-redundancy.

- If no preferred path is assigned, the unit is targeted through the controller that first detects the unit after the controllers start.
- Select *PREFERRED_PATH=THIS_CONTROLLER* to instruct “this controller” to bring the units online.
- Select *PREFERRED_PATH=OTHER_CONTROLLER* to instruct the “other controller” to bring the units online.

Note: All partitions on a container must be addressed through the same controller. If you set *PREFERRED_PATH* for one partition, all partitions on that container inherit the same path.

READ_CACHE *(default)* *NOREAD_CACHE*

Controls how and where the controller retrieves previous read request data and submits that data to the host.

- Specify *READ_CACHE* to direct the controller (after it receives a read request from the host), to read the data from the disk drives, deliver it to the host, and store the data in its cache module. Subsequent reads for the same data takes the data from cache rather than accessing the data from the disks.
- Specify *NOREAD_CACHE* to prevent the controller (after it receives a read request from the host), from reading the data from the disk drives, delivering it to the host, and storing the data in its cache module.

Read caching improves performance in almost all situations. Therefore, HP recommends that you leave its default setting, *READ_CACHE*, enabled. However, under certain conditions, such as when performing a backup, read caching may not be necessary because the data is probably not re-read. In such instances, it can be beneficial to disable the read cache function and remove the processing overhead associated with caching data.

READAHEAD_CACHE *(default)* *NOREADAHEAD_CACHE*

Enables the controller to keep track of read I/Os. If the controller detects sequential read I/Os from the host, it then tries to keep ahead of the host by reading the next sequential blocks of data (those the host has not yet requested) and put the data in cache. This process is sometimes referred to as *prefetch*. The controller can detect multiple sequential I/O requests across multiple units.

Read-ahead caching improves host application performance because the data is read from the controller cache instead of disk. Read-ahead caching is the default for units.

If you have a unit that is not expected to get sequential I/O requests, select *NOREADAHEAD_CACHE* for the unit.

RUN *(default)*
NORUN

Controls unit availability to the host.

- Specify *RUN* to make a unit available to the host.
- Specify *NORUN* to make a unit unavailable to the host and to cause any data in cache to be flushed to one or more drives. *NORUN* spins down all the disks used in the unit. The drives making up the unit spin down after the data is completely flushed.

Note: Regardless of storageset type, the *NORUN* switch cannot be specified for units that are partitioned.

Note: Specifying *NORUN* and then *RUN* to a unit also causes the subsystem configuration to be updated to the selected disk unit.

WRITE_PROTECT
NOWRITE_PROTECT *(default)*

Specifies whether data contained on the selected unit can be overwritten.

- Specify *WRITE_PROTECT* to prevent host write operations to the unit. However, the controller can still write to a write-protected RAIDset to satisfy a reconstruct pass or to reconstruct a newly replaced member. Additionally, metadata, reconstruct, and copy writes are still allowed to RAIDsets and mirrorsets.
- Specify *NOWRITE_PROTECT* to allow the host to write data to the unit. This allows the controller to overwrite existing data. *NOWRITE_PROTECT* is the default for transportable disks.

WRITEBACK_CACHE *(default)*
NOWRITEBACK_CACHE

Enables or disables the writeback data caching function of the controller. Controller writeback caching feature improves write performance.

- Specify *WRITEBACK_CACHE* for all new RAIDsets, mirrorsets, and units to take advantage of the controller writeback caching feature. This switch allows the controller to declare the write operation *complete* as soon as the data reaches its cache memory. The controller performs the slower operation of writing the data to the disk drives at a later time.

Caution: Though there is built-in redundancy in mirrored cache to protect data, allowing data to be written to writeback cache can result in the loss of data if the cache fails.

WRITEBACK_CACHE cannot be applied to transportable disks.

The *NOWRITEBACK_CACHE* switch enables only write-through caching. In write-through caching, if the controller receives a write request from the host it places the data in its cache module, writes the data to the disk drives, and then notifies the host if the write operation is *complete*. Write-through caching is enabled only if writeback caching is disabled.

NOWRITEBACK_CACHE is the default on transportable disks.

Note: If you use the *NOWRITEBACK_CACHE* switch, the controller can take 5 minutes to flush data contained within the writeback cache.

Examples

To enable write protect and turn off the read cache on unit D102, enter:

```
SET D102 WRITE_PROTECT NOREAD_CACHE
```

To allow only a host connection named Roger1 to access unit D0, enter:

```
SET D0 DISABLE_ACCESS_PATH=ALL
SET D0 ENABLE_ACCESS_PATH=ROGER1
```

If the controller is unable to submit data from the original unit to the host, enter the command shown in Figure 10. Issuing this command prevents the redirection of the host to the redundant unit copy for the original requested unit data. Issue the `SHOW` *`unit-number`* command to see host setting details.

```
HSG80TOP> SET D40 NOHOST_REDUNDANT
HSG80TOP> SHOW D40
    LUN                                     Uses             Used by
----------------------------------------------------------------------------


  D40                                       R0
        LUN ID:      6000-1FE1-FF1C-2BF0-0009-9471-1788-0410
        IDENTIFIER = 1040
        Switches:
          RUN                   NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE       WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             16344 blocks
        Geometry (C/H/S): ( 87 / 10 / 19 )
        NOHOST_REDUNDANT
```

Figure 10: Preventing the redirection of hosts to a redundant unit copy

See Also

`ADD UNITS`
`SHOW` *`unit-number`*

SHOW ASSOCIATIONS

Displays information on all association sets known to the subsystem.

Syntax

`SHOW ASSOCIATIONS`

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW ASSOCIATIONS` command:

FULL

Provides additional details regarding subsystem associations.

Example

```
INT_TOP> show association

Name          Association                    Uses             Used by
------------------------------------------------------------------
A1            association                    RCS1
                                             RCS2
                                             RCS3
                                             RCS4
```

Figure 11: Screen display after issuing the SHOW ASSOCIATION command

See Also

ADD ASSOCIATIONS
SET *association-set-name*
SHOW *association-set-name*

SHOW *association-set-name*

Displays information on the specified association set.

Syntax

`SHOW` *`association-set-name`*

Parameters

The following parameter is associated with the `SHOW` command:

association-set-name

Specifies the name of the association set to be displayed.

Switches

There are no switches associated with this command.

Example

```
INT_TOP> show A1
Name          Association                    Uses             Used by
------------------------------------------------------------------
A1            association                    RCS1
                                             RCS2
                                             RCS3

        Switches:
          NOFAIL_ALL
          NOORDER_ALL
```

Figure 12: Screen display after issuing the SHOW association-set-name command

See Also

ADD ASSOCIATIONS
SET *association-set-name*
SHOW ASSOCIATIONS

SHOW *concatset-name*

Displays information on the specified concatset.

Syntax

`SHOW` *`concatset-name`*

Parameters

The following parameter is associated with the `SHOW` command:

concatset-name

Specifies the name of the concatset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show C1

Name          Storageset                     Uses            Used by
------------------------------------------------------------------
C1            concatset                      DISK10300       D1
                                             DISK30400
        State:
          NORMAL
         DISK10300 (member  0) is NORMAL
         DISK30400 (member  1) is NORMAL
        Size:             35538354 blocks
```

Screen display after issuing the SHOW concatset-name command

See Also

ADD CONCATSETS
SET *concatset-name*
SHOW CONCATSETS

SHOW CONCATSETS

Displays information on all concatsets known to the subsystem.

Syntax

`SHOW CONCATSETS`

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW CONCATSETS` command:

FULL

Provides additional details regarding concatenated sets.

Example

```
show concatsets

Name          Storageset                    Uses           Used by
-------------------------------------------------------------------
C1            concatset                     DISK10300      D1
                                            DISK30400
```

Figure 13: Screen display after issuing the SHOW CONCATSET command

See Also

`ADD CONCATSETS`
`SET` *`concatset-name`*
`SHOW` *`concatset-name`*

SHOW *connection-name*

Displays the following information for the specified *connection-name*: operating system, controller, controller port, adapter ID address, online or offline status, and unit offset.

Syntax

`SHOW` *`connection-name`*

Parameters

The following parameter is associated with the `SHOW` command:

connection-name

Specifies the name of the connection to be displayed.

Switches

There are no switches associated with this command.

Examples

The `SHOW` *`connection-name`* command displays rejected hosts with an index (see Figure 14).

```
SMV_Top> sho REV50A

Connection

Name         Operating    Controller   Port   Address      Status       Offset
             System

REV50A       TRU64_UNIX   THIS           1    011000       OL this         0

   HOST_ID=2000-0000-C922-556D      ADAPTER_ID=1000-0000-C922-556D
```

Figure 14: Screen display after issuing the SHOW connection-name command

See Also

`ADD CONNECTIONS`
`DELETE` *`connection-name`*
`RENAME`
`SET` *`connection-name`*

SHOW CONNECTIONS

Displays the following information for all connections: connection name, operating system, controller, controller port, adapter ID address, online or offline status, and unit offset.

`<<< LOCKED >>>` appears in the title area if the connection table is locked.

Syntax

```
SHOW CONNECTIONS
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW CONNECTIONS` command:

FULL

Displays the rejected hosts, with an index, and a summary of allowed, used, free, and rejected connections.

Examples

The *FULL* switch displays rejected hosts with an index.

```
HSG80> show conn full
Connection                                                              Unit
   Name      Operating system    Controller  Port    Address    Status   Offset

CONN1             WINNT              THIS       1               offline        0
           HOST_ID=4000-0000-2345-1111        ADAPTER_ID=1000-0000-2345-1111

CONN2             WINNT              THIS       1               offline        0
           HOST_ID=4000-0000-2345-2222        ADAPTER_ID=1000-0000-2345-2222

CONN3             WINNT              OTHER      1               offline        0
           HOST_ID=4000-0000-2345-3333        ADAPTER_ID=1000-0000-2345-3333

Rejected connections:
Key         HOST_ID                ADAPTER_ID          Controller    Port
0    2000-0000-C921-0919    1000-0000-C921-0919       THIS          2
1    2000-0000-C922-556D    1000-0000-C922-556D       THIS          1
2    2000-0000-C922-556D    1000-0000-C922-556D       OTHER         1

Connection Summary:
------------------
Maximum Allowed Connections = 96
Used Connections = 3
Free Connections = 0
Rejected Connections = 3
```

Figure 15: Screen display after issuing the SHOW CONNECTIONS FULL command

See Also

ADD CONNECTIONS
DELETE *connection-name*
RENAME
SET *connection-name*
SHOW *connection-name*

SHOW *controller*

Displays information about the specified controller.

Syntax

`SHOW controller`

Parameters

The following parameter is associated with the `SHOW` command:

controller

Identifies which controller is displayed. Specify `THIS_CONTROLLER` (the one connected to the CLI maintenance terminal) or `OTHER_CONTROLLER`.

Switches

The following switch supports the `SHOW controller` command:

FULL

Provides additional details regarding the controller configuration.

Example

To display the full information for a controller, enter the `SHOW` *`controller FULL`* (see Figure 16).

```
SHOW OTHER_CONTROLLER FULL

      Controller:
      Copyright 2002-2003 Hewlett-Packard Development Company, L.P.
      HSG80 Software version 88F-1, Hardware version 0000
      NODE_ID          = 5000-1FE1-0005-9C10
      ALLOCATION_CLASS = 1
      SCSI_VERSION     = SCSI-2
      Configured for MULTIBUS_FAILOVER with ZG95005203
      In dual-redundant configuration
      Device Port SCSI address 7
      Time: NOT SET
      Command Console LUN is lun 0 (NOIDENTIFIER)
      Host Connection Table is NOT locked
      Smart Error Eject Disabled
Host PORT_1:
      Reported PORT_ID = 5000-1FE1-0005-9C13
      PORT_1_TOPOLOGY  = FABRIC (connection down)
Host PORT_2:
      Reported PORT_ID = 5000-1FE1-0005-9C14
      PORT_2_TOPOLOGY  = FABRIC (connection down)
      NOREMOTE_COPY
Cache:
      32 megabyte write cache, version 0012
      Cache is GOOD
      Unflushed data in cache
      CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
Mirrored Cache:
      32 megabyte write cache, version 0012
      Cache is GOOD
      Unflushed data in cache
Battery:
      NOUPS
      FULLY CHARGED
      Expires:             04-MAY-2005
Extended information:
      Terminal speed 19200 baud, eight bit, no parity, 1 stop bit
      Operation control: 00000000  Security state code: 25059
      Configuration backup disabled

      Unit Default access enabled
      SCSI Fairness Disabled
      Vendor ID: DEC
```

Figure 16: Screen display after issuing the SHOW controller FULL command

See Also

RESTART *controller*
SET *controller*
SET MULTIBUS_FAILOVER
SHUTDOWN *controller*

SHOW DEVICES

Displays information about all devices known to the subsystem.

Syntax

```
SHOW DEVICES
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW DEVICES` command:

FULL

Provides additional details regarding subsystem disk devices.

Example

```
BOT> show devices

Name           Type                        Port Targ  Lun         Used by
------------------------------------------------------------------
DISK10000      disk                           1    0    0         M1
DISK20000      disk                           2    0    0         M1
DISK20400      disk                           2    4    0         M1
DISK30400      disk                           3    4    0         SPARESET
```

Figure 17: Screen display after issuing the SHOW DEVICES command

See Also

```
SHOW DISKS
SHOW FAILEDSETS
SHOW MIRRORSETS
SHOW RAIDSETS
SHOW SPARESETS
SHOW STRIPESETS
SHOW unit-number
```

SHOW DISKS

Displays information about all disks known to the subsystem.

Syntax

```
SHOW DISKS
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the SHOW DISKS command:

FULL

Provides additional details regarding subsystem disks.

Example

```
BOT> show disks

Name          Type                         Port Targ  Lun        Used by
------------------------------------------------------------------
DISK10000     disk                            1    0    0        M1
DISK20000     disk                            2    0    0        M1
DISK20400     disk                            2    4    0        M1
DISK30400     disk                            3    4    0        SPARESET
```

Figure 18: Screen display after issuing the SHOW DISKS command

See Also

`ADD DISKS`
`DELETE` *`container-name`*
`SET` *`device-name`*
`SHOW DEVICES`

SHOW *disk-name*

Displays information about the specified disks.

Syntax

```
SHOW disk-name
```

Parameters

disk-name

Specifies the name of the disk to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show DISK10000

Name          Type                         Port Targ  Lun        Used by
------------------------------------------------------------------
DISK10000     disk                            1    0    0         M1
          COMPAQ   BD0366349C       3B02
     Switches:
       NOTRANSPORTABLE
       TRANSFER_RATE_REQUESTED=20MHZ(synchronous 20.00 MHZ negotiated)
     Size:             71114623 blocks
```

Figure 19: Screen display after issuing the SHOW disk-name command

See Also

`ADD DISKS`
`DELETE` *`container-name`*
`SET` *`device-name`*
`SHOW DISKS`

SHOW ELEVATION_INFO

Provides a full output of relevant controller information and its operation configuration. This command and its output display benefits your HP service providers because its report provides a complete listing of controller configuration information that is elevated and transferred to support organizations. It is best to capture this information as soon as a storage anomaly is observed. This command combines to following commands to provide a complete subsystem report:

- `SHOW` *`controller`* (`THIS CONTROLLER` with the *`FULL`* switch)
- `SHOW` *`controller`* (`OTHER CONTROLLER` with the *`FULL`* switch)
- `SHOW REMOTE_COPY_SETS` (with the *`FULL`* switch)
- `SHOW ASSOCIATIONS` (with the *`FULL`* switch)
- `SHOW CONNECTIONS` (with the *`FULL`* switch)
- `SHOW MANAGERS`
- `SHOW DEVICES` (with the *`FULL`* switch)
- `SHOW STORAGESETS` (with the *`FULL`* switch)
- `SHOW` *`unit-number`* (with the *`FULL`* switch)

Note: The system displays the following messages after issuing the `SHOW ELEVATION` command if a controller is not configured, inoperable, or missing.

For a controller that is missing or not configured:

```
*********************************************************
Other controller information in full (SHOW OTHER FULL).
*********************************************************
Error 6070: Illegal command -- this controller not
configured for dual-redundancy
```

For a controller that is inoperable:

```
*********************************************************
Other controller information in full (SHOW OTHER FULL).
*********************************************************
Error 6080: Command illegal at this time -- this
controller configured for dual-redundancy, but the other
controller is not running or not configured for
redundancy.  Correct this condition and re-issue the
command.
```

Note: Before escalating support calls to an HP support representative, issue the following commands and capture subsequent screen displays from each controller at the time a controller problem is suspected. Capture screen displays as close to the actual occurrence of the problem as possible (that is, before controller restarts).

```
CLI> SHOW ELEVATION
CLI> RUN FMU
FMU> SHOW LAST ALL FULL
FMU> SHOW DEVICE_ERROR
FMU> SHOW DEVICE_INFO
FMU> EXIT
```

For additional information on the above *FMU* commands, refer to the *HP StorageWorks HSG60 and HSG80 Array Controller and Array Controller Software Troubleshooting Guide*.

Syntax

```
SHOW ELEVATION_INFO
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

The following pages show an example of the report generated after the `SHOW ELEVATIONS_INFO` command is submitted.

```
hsg80_bot> show elevation

        Nindy is currently OFF

        Time: 05-JUN-2004 12:00:21
       Power On Time: 0. Years, 0. Days, 0


*****************************************
        This controller information in fu
*****************************************

Controller:
        HSG80 ZG95114377 Software V88S-1,
        NODE_ID          = 5000-1FE1-0001
        ALLOCATION_CLASS = 0
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER
            In dual-redundant configurati
        Device Port SCSI address 6
        Time: 05-JUN-2004 12:00:22
        Command Console LUN is lun 0 (NOI
        Host Connection Table is NOT lock
        Smart Error Eject Disabled
Host PORT_1:
        Reported PORT_ID = 5000-1FE1-0001
        PORT_1_TOPOLOGY  = FABRIC (fabric
        Address          = 151100
Host PORT_2:
        Reported PORT_ID = 5000-1FE1-0001
        PORT_2_TOPOLOGY  = FABRIC (fabric
        Address          = 151300
        NOREMOTE_COPY
Cache:
        256 megabyte write cache, version
        Cache is GOOD
        No unflushed data in cache
        CACHE_FLUSH_TIMER = DEFAULT (10 s
Mirrored Cache:
        256 megabyte write cache, version
        Cache is GOOD
        No unflushed data in cache
Battery:
        NOUPS
        FULLY CHARGED
        Expires:            16-MAY-2007
Extended information:
        Terminal speed 9600 baud, eight b
        Operation control: 00000000  Secu
        Configuration backup disabled
        Unit Default access enabled
        SCSI Fairness Disabled
        Vendor ID: DEC
```

```
***************************************************************
        Other controller information in full (SHOW OTHER FULL).
***************************************************************

Controller:
        HSG80 ZG12345678 Software V8.8S-1, Hardware 0000
        NODE_ID          = 5000-1FE1-0001-E200
        ALLOCATION_CLASS = 0
        SCSI_VERSION     = SCSI-3
        Configured for MULTIBUS_FAILOVER with ZG95114377
            In dual-redundant configuration
        Device Port SCSI address 7
        Time: 05-JUN-2004 12:00:26
        Command Console LUN is lun 0 (NOIDENTIFIER)
        Host Connection Table is NOT locked
        Smart Error Eject Disabled
Host PORT_1:
        Reported PORT_ID = 5000-1FE1-0001-E203
        PORT_1_TOPOLOGY  = FABRIC (fabric up)
        Address          = 151000
Host PORT_2:
        Reported PORT_ID = 5000-1FE1-0001-E204
        PORT_2_TOPOLOGY  = FABRIC (fabric up)
        Address          = 151200
        NOREMOTE_COPY
Cache:
        256 megabyte write cache, version 0022
        Cache is GOOD
        No unflushed data in cache
        CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
Mirrored Cache:
        256 megabyte write cache, version 0022
        Cache is GOOD
        No unflushed data in cache
Battery:
        NOUPS
        FULLY CHARGED
        Expires:            16-MAY-2007
Extended information:
        Terminal speed 9600 baud, eight bit, no parity, 1 stop bit
        Operation control: 00000000  Security state code: 6894
        Configuration backup disabled
        Unit Default access enabled
        SCSI Fairness Disabled
        Vendor ID: DEC

***************************************************************
        Information of all remote copy sets in full (SHOW REMOTE FULL).
***************************************************************
No REMOTE_COPY_SETS

***************************************************************
        Information of all association sets in full (SHOW ASSOCIATION
FULL).
***************************************************************
No ASSOCIATIONS
```

```
****************************************************************
        Information of all connections in full (SHOW CONNECTION FULL).
****************************************************************

Connection
   Name      Operating system    Controll
Offset

!NEWCON29        VMS            THIS
      HOST_ID=2000-0000-C927-6191     AD

!NEWCON30        VMS            THIS
      HOST_ID=2000-0000-C927-6191     AD

!NEWCON31        VMS            THIS
      HOST_ID=2000-0000-C923-01EA     AD

!NEWCON32        VMS            THIS
      HOST_ID=2000-0000-C923-01EA     AD

!NEWCON33        VMS            OTHER
      HOST_ID=2000-0000-C927-6191     AD

!NEWCON34        VMS            OTHER
      HOST_ID=2000-0000-C927-6191     AD

!NEWCON35        VMS            OTHER
      HOST_ID=2000-0000-C923-01EA     AD

!NEWCON36        VMS            OTHER
      HOST_ID=2000-0000-C923-01EA     AD

No rejected Hosts

Connection Summary:
------------------
Maximum Allowed Connections = 96
Used Connections = 8
Free Connections = 88
Rejected Connections = 0
```

```
****************************************************************
        Management information (SHOW MANAGER).
****************************************************************

Connection              <<<All Connections Enabled>>>
   Name      Operating System    Controller  Port    Address    Status

!NEWCON29        VMS            THIS         1    151F00    OL this   0
      HOST_ID=2000-0000-C927-6191     ADAPTER_ID=1000-0000-C927-6191

!NEWCON30        VMS            THIS         2    151F00    OL this   100
      HOST_ID=2000-0000-C927-6191     ADAPTER_ID=1000-0000-C927-6191

!NEWCON31        VMS            THIS         1    151E00    OL this   0
      HOST_ID=2000-0000-C923-01EA     ADAPTER_ID=1000-0000-C923-01EA

!NEWCON32        VMS            THIS         2    151E00    OL this   100
      HOST_ID=2000-0000-C923-01EA     ADAPTER_ID=1000-0000-C923-01EA

!NEWCON33        VMS            OTHER        1    151F00    OL other  0
      HOST_ID=2000-0000-C927-6191     ADAPTER_ID=1000-0000-C927-6191

!NEWCON34        VMS            OTHER        2    151F00    OL other  100
      HOST_ID=2000-0000-C927-6191     ADAPTER_ID=1000-0000-C927-6191

!NEWCON35        VMS            OTHER        1    151E00    OL other   0
      HOST_ID=2000-0000-C923-01EA     ADAPTER_ID=1000-0000-C923-01EA

!NEWCON36        VMS            OTHER        2    151E00    OL other  100
      HOST_ID=2000-0000-C923-01EA     ADAPTER_ID=1000-0000-C923-01EA

                        <<<All Connections Enabled>>>

****************************************************************
        VSI tree information in full (DEBUG VA SHOW_CONFIG_ALL).
****************************************************************
     Nv  St  Up   Us   Dn   Ds
-------------------------------
#### 0021 4 fffe 0020 000e fffe Un D5 USB c0de8070 0 Part 0363a000 00000000
#### 0020 4 fffe 001f 000e fffe Un D4    USB c0de8b90  1 Part 028ab800 00000000
#### 001f 4 fffe 0010 000e fffe Un D3    USB c0de96b0  2 Part 01b1d000 00000000
#### 0010 4 fffe 000f 000e fffe Un D2    USB c0dea1d0  3 Part 00d8e800 00000000
#### 000f 4 fffe fffe 000e fffe Un D1    USB c0deacf0  4 Part 00000000 00000000
 ### 000e 4 0021 fffe 000b fffe St      RSDB 80fa8fec mem  4
   # 000b 4 000e fffe fffe 0029 Dv 1:1:0 PUB c0488054 Type 00  Pub st    6 ri  2
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181
vaconfo 17773521, vaid1 17773522, vsilbnsiz 17769177, vsicontsiz 0  mdatav 11,
nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd 0, save_c 0, parted 1,
sc-dis 0 fe_directory[0]=C01FA100, fe_directory[1]=C0FFCB80
   # 0029 4 000e fffe fffe 000c Dv 2:0:0 PUB c0488228 Type 00  Pub st    6 ri  0
 BLOX: vaso 35556389, vabbro 35556389, vafediro 35556391, vafeo 35556394
vaconfo 35565077, vaid1 35565078, vsilbnsiz 35556389, vsicontsiz 0  mdatav 11,
nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd 0, save_c 0, parted 1,
sc-dis 0 fe_directory[0]=C01FA100, fe_directory[1]=C0FFCB80
   # 000c 4 000e fffe fffe 001a Dv 3:1:0 PUB c0487e80 Type 00  Pub st    6 ri  1
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181
vaconfo 17773521, vaid1 17773522, vsilbnsiz 17769177, vsicontsiz 0  mdatav 11,
nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd 0, save_c 0, parted 1,
sc-dis 0 fe_directory[0]=C01FA100, fe_directory[1]=C0FFCB80
```

```
# 001a 4 000e fffe fffe fffe Dv 5:1:0 PUB c0487cac Type 00  Pub st    6 ri  3
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181  vaconfo
17773521, vaid1 17773522, vsilbnsiz 17769177, vsicontsiz 0  mdatav 11, nodest 0,
prev_online 0, size_val 1, id0_gd 0, id1_gd 0, save_c 0, parted 1, sc-dis 0
fe_directory[0]=C01FA100, fe_directory[1]=C0FFCB80

     Nv  St  Up   Us   Dn   Ds
-------------------------------
#### 0028 4 fffe 0027 0022 fffe Un D10   U
#### 0027 4 fffe 0025 0022 fffe Un D9    U
#### 0025 4 fffe 0024 0022 fffe Un D8    U
#### 0024 4 fffe 0023 0022 fffe Un D7    U
#### 0023 4 fffe fffe 0022 fffe Un D6    U
 ### 0022 4 0028 fffe 0011 fffe St      RS
   # 0011 4 0022 fffe fffe 0017 Dv 1:2:0 P
 BLOX: vaso 17769177, vabbro 17769177, vaf
17773521, vaid1 17773522, vsilbnsiz 177691
vsicontsiz 0  mdatav 11, nodest 0, prev_on
save_c 0, parted 1, sc-dis 0 fe_directory[
   # 0017 4 0022 fffe fffe 001b Dv 3:2:0 P
 BLOX: vaso 17769177, vabbro 17769177, vaf
17773521, vaid1 17773522, vsilbnsiz 177691
vsicontsiz 0  mdatav 11, nodest 0, prev_on
save_c 0, parted 1, sc-dis 0 fe_directory[
   # 001b 4 0022 fffe fffe fffe Dv 5:2:0 P
 BLOX: vaso 17769177, vabbro 17769177, vaf
17773521, vaid1 17773522, vsilbnsiz 177691
vsicontsiz 0  mdatav 11, nodest 0, prev_on
save_c 0, parted 1, sc-dis 0 fe_directory[

     Nv  St  Up   Us   Dn   Ds
-------------------------------
#### 0030 1 fffe 002f 002a fffe Un D150  U
#### 002f 1 fffe 002e 002a fffe Un D140  U
#### 002e 1 fffe 002d 002a fffe Un D130  U
#### 002d 1 fffe 002b 002a fffe Un D120  U
#### 002b 1 fffe fffe 002a fffe Un D110  U
 ### 002a 1 0030 fffe 0012 fffe St      RS
   # 0012 1 002a fffe fffe 0018 Dv 1:3:0 P
 BLOX: vaso 17769177, vabbro 17769177, vaf
17773521, vaid1 17773522, vsilbnsiz 177691
vsicontsiz 0  mdatav 11, nodest 0, prev_on
save_c 0, parted 1, sc-dis 0 fe_directory[
   # 0018 1 002a fffe fffe 001c Dv 3:3:0 P
 BLOX: vaso 17769177, vabbro 17769177, vaf
17773521, vaid1 17773522, vsilbnsiz 177691
vsicontsiz 0  mdatav 11, nodest 0, prev_on
save_c 0, parted 1, sc-dis 0 fe_directory[
   # 001c 1 002a fffe fffe fffe Dv 5:3:0 P
 BLOX: vaso 17769177, vabbro 17769177, vaf
17773521, vaid1 17773522, vsilbnsiz 177691
 vsicontsiz 0  mdatav 11, nodest 0, prev_or
save_c 0, parted 1, sc-dis 0 fe_directory[

     Nv  St  Up   Us   Dn   Ds
-------------------------------
#### 0036 1 fffe 0035 0031 fffe Un D199  U
#### 0035 1 fffe 0034 0031 fffe Un D190  U
#### 0034 1 fffe 0033 0031 fffe Un D180  U
#### 0033 1 fffe 0032 0031 fffe Un D170  U
#### 0032 1 fffe fffe 0031 fffe Un D160  U
 ### 0031 1 0036 fffe 0013 fffe St      RS
   # 0013 1 0031 fffe fffe 0019 Dv 1:4:0 P
```

```
BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181  vaconfo
17773521, vaid1 17773522, vsilbnsiz 17769177,
vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 1, id1_gd
1, save_c 0, parted 1, sc-dis 0 fe_directory[0]=627FFE00,
fe_directory[1]=62806200
   # 0019 1 0031 fffe fffe 001d Dv 3:4:0 PUB c0486e0c Type 00  Pub st    5 ri  1
 BLOX: vaso 17769153, vabbro 17769153, vafediro 17769155, vafeo 17769157
vaconfo 17773497, vaid1 17773498, vsilbnsiz 17769153,
vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 1, id1_gd
1, save_c 0, parted 1, sc-dis 0 fe_directory[0]=62806600,
fe_directory[1]=62806A00
   # 001d 1 0031 fffe fffe fffe Dv 5:4:0 PUB c0486c38 Type 00  Pub st    5 ri  2
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181
vaconfo 17773521, vaid1 17773522, vsilbnsiz 17769177,
 vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 1, id1_gd
1, save_c 0, parted 1, sc-dis 0 fe_directory[0]=62806E00,
fe_directory[1]=62807200

     Nv  St  Up   Us   Dn   Ds
-------------------------------
  ## 0008 3 fffe fffe fffe fffe Failedset

     Nv  St  Up   Us   Dn   Ds
-------------------------------
  ## 0009 3 fffe fffe fffe fffe Spareset

     Nv  St  Up   Us   Dn   Ds
-------------------------------
   # 0014 2 fffe fffe fffe fffe Dv 1:5:0 PUB c0486a64 Type 00  Pub st    6
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181
vaconfo 17773521, vaid1 17773522, vsilbnsiz 17769177,
vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd
0, save_c 0, parted 0, sc-dis 0 fe_directory[0]=C01FA100,
fe_directory[1]=C0FFCB80

     Nv  St  Up   Us   Dn   Ds
-------------------------------
   # 0015 2 fffe fffe fffe fffe Dv 1:8:0 PUB c04864e8 Type 00  Pub st    6
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181
vaconfo 17773521, vaid1 17773522, vsilbnsiz 17769177,
vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd
0, save_c 0, parted 0, sc-dis 0 fe_directory[0]=C01FA100,
fe_directory[1]=C0FFCB80

     Nv  St  Up   Us   Dn   Ds
-------------------------------
   # 0016 2 fffe fffe fffe fffe Dv 3:0:0 PUB c04883fc Type 00  Pub st    6
 BLOX: vaso 71114623, vabbro 71114623, vafediro 71114625, vafeo 71114630
vaconfo 71131997, vaid1 71131998, vsilbnsiz 71114623,
vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd
0, save_c 0, parted 0, sc-dis 0 fe_directory[0]=C01FA100,
fe_directory[1]=C0FFCB80
Nv  St  Up   Us   Dn   Ds
-------------------------------
   # 001e 2 fffe fffe fffe fffe Dv 5:5:0 PUB c0486890 Type 00  Pub st    6
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181
vaconfo 17773521, vaid1 17773522, vsilbnsiz 17769177,
vsicontsiz 0  mdatav 11, nodest 0, prev_online 0, size_val 1, id0_gd 0, id1_gd
0, save_c 0, parted 0, sc-dis 0 fe_directory[0]=C01FA100,
fe_directory[1]=C0FFCB80
```

```
Nv  St  Up   Us   Dn   Ds
-------------------------------
   # 0026 2 fffe fffe fffe fffe Dv 5:8:0 PUB c0486314 Type 00  Pub st    6
 BLOX: vaso 17769177, vabbro 17769177, vafediro 17769179, vafeo 17769181  vaconfo
17773521, vaid1 17773522, vsilbnsiz 17769177,
vsicontsiz 0  mdatav 11, nodest 0, prev_online
save_c 0, parted 0, sc-dis 0 fe_directory[0]=

     Nv  St  Up   Us   Dn   Ds
-------------------------------
   # 002c 2 fffe fffe fffe fffe Dv 3:5:0 PUB
 BLOX: vaso 17769177, vabbro 17769177, vafedir
17773521, vaid1 17773522, vsilbnsiz 17769177,
vsicontsiz 0  mdatav 11, nodest 0, prev_online
save_c 0, parted 0, sc-dis 0 fe_directory[0]=

*********************************************
        Information of all devices in full (S
*********************************************

Name          Type                      Port
---------------------------------------------

DISK10100     disk                        1
          COMPAQ   BD009122BA       3B08
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (sy
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed
DISK10200     disk                        1
          COMPAQ   BD00962373       BCJE
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (sy
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed
DISK10300     disk                        1
          COMPAQ   BD00962373       BCJ9
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (sy
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed
DISK10400     disk                        1
          COMPAQ   BD009122BA       3B08
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (sy
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed
DISK10500     disk                        1
          COMPAQ   BD009122BA       3B08
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (sy
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed
```

```
DISK10800     disk                        1    8    0
          COMPAQ   BD009122BA       3B08
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed up on this container
DISK20000     disk                        2    0    0       S1
          COMPAQ   BD0186398C       B92J
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             35556389 blocks
        V- 11 Configuration NOT being backed up on this container
DISK30000     disk                        3    0    0
          COMPAQ   BD0366349C       3B02
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             71114623 blocks
        V- 11 Configuration NOT being backed up on this container
DISK30100     disk                        3    1    0       S1
          COMPAQ   BD009122C6       B016
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed up on this container
DISK30200     disk                        3    2    0       S2
          COMPAQ   BD009122BA       3B08
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed up on this container
DISK30300     disk                        3    3    0       S3
          COMPAQ   BD009122BA       3B07
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed up on this container
DISK50800     disk                        5    8    0
          COMPAQ   BD00962373       BCJ9
        Switches:
          NOTRANSPORTABLE
          TRANSFER_RATE_REQUESTED = 20MHZ (synchronous 20.00 MHZ negotiated)
        Size:             17769177 blocks
        V- 11 Configuration NOT being backed up on this container
BOT           logdisk                     1    0    0
          COMPAQ   AD009322C5       A019
        Size:             17773500 blocks
        Logdisk for this controller
TOP           logdisk                     5    0    0
        Logdisk for other controller
```

```
**************************************************************
      Information of all storage sets in full (SHOW STORAGE FULL).
**************************************************************

Name          Storageset
---------------------------------------------

S1            stripeset




      Switches:
        CHUNKSIZE = 256 blocks
      State:
        NORMAL
        DISK10100 (member  0) is NORMAL
        DISK20000 (member  1) is NORMAL
        DISK30100 (member  2) is NORMAL
        DISK50100 (member  3) is NORMAL
      Size:          71076708 blocks
      Partitions:
        Partition number        Size
        -----------------------------------
          1                 14215163 (   72
          2                 14215163 (   72
          3                 14215163 (   72
          4                 14215163 (   72
          5                 14215163 (   72
                                 863 (

S2            stripeset



      Switches:
        CHUNKSIZE = 256 blocks
      State:
        NORMAL
        DISK10200 (member  0) is NORMAL
        DISK30200 (member  1) is NORMAL
        DISK50200 (member  2) is NORMAL
      Size:          53307531 blocks
      Partitions:
        Partition number        Size
        -----------------------------------
          1                 10661371 (   54
          2                 10661371 (   54
          3                 10661371 (   54
          4                 10661371 (   54
          5                 10661371 (   54
                                 646 (
```

```
S2            stripeset                     DISK10200        D10
                                            DISK30200        D6
                                            DISK50200        D7
                                                             D8
                                                             D9
      Switches:
        CHUNKSIZE = 256 blocks
      State:
        NORMAL
        DISK10200 (member  0) is NORMAL
        DISK30200 (member  1) is NORMAL
        DISK50200 (member  2) is NORMAL
      Size:            53307531 blocks
      Partitions:
       Partition number       Size              Starting Block     Used
by

--------------------------------------------------------------------
          1               10661371 (   5458.62 MB)          0      D6
          2               10661371 (   5458.62 MB)     10661376    D7
          3               10661371 (   5458.62 MB)     21322752    D8
          4               10661371 (   5458.62 MB)     31984128    D9
          5               10661371 (   5458.62 MB)     42645504    D10
                                 646 (      0.33 MB)     53306880
<free>

S3            stripeset                     DISK10300        D110
                                            DISK30300        D120
                                            DISK50300        D130
                                                             D140
                                                             D150
      Switches:
        CHUNKSIZE = 256 blocks
      State:
        NORMAL
        DISK10300 (member  0) is NORMAL
        DISK30300 (member  1) is NORMAL
        DISK50300 (member  2) is NORMAL
      Size:            53307531 blocks
      Partitions:
       Partition number       Size              Starting Block     Used
by

--------------------------------------------------------------------
          1               10661371 (   5458.62 MB)          0      D110
          2               10661371 (   5458.62 MB)     10661376    D120
          3               10661371 (   5458.62 MB)     21322752    D130
          4               10661371 (   5458.62 MB)     31984128    D140
          5               10661371 (   5458.62 MB)     42645504    D150
                                 646 (      0.33 MB)     53306880
<free>
```

```
S3          stripeset                    DISK10300       D110
                                         DISK30300       D120
                                         DISK50300       D130
                                                         D140


        Switches:
          CHUNKSIZE = 256 blocks
        State:
          NORMAL
          DISK10300 (member  0) is NORMAL
          DISK30300 (member  1) is NORMAL
          DISK50300 (member  2) is NORMAL
        Size:           53307531 blocks
        Partitions:
          Partition number       Size
          ------------------------------------
            1                10661371 (   545
            2                10661371 (   545
            3                10661371 (   545
            4                10661371 (   545
            5                10661371 (   545
                                  646 (

S4          stripeset                    D
                                         D
                                         D


        Switches:
          CHUNKSIZE = 256 blocks
        State:
          NORMAL
          DISK10400 (member  0) is NORMAL
          DISK30400 (member  1) is NORMAL
          DISK50400 (member  2) is NORMAL
        Size:           53307459 blocks
        Partitions:
          Partition number       Size
          ------------------------------------
            1                10661371 (   545
            2                10661371 (   545
            3                10661371 (   545
            4                10661371 (   545
            5                10661371 (   545
                                  574 (

SPARESET     spareset

FAILEDSET    failedset
        Switches:
          NOAUTOSPARE
```

```
**************************************************************
        Information of all units in full (SHOW UNITS FULL).
**************************************************************

    LUN                                      Uses            Used by
------------------------------------------------------------------------------

  D1                                         S1           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02B3
        IDENTIFIER = 1
        Switches:
          RUN                   NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE       WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to the other controller
          PREFERRED_PATH = OTHER_CONTROLLER
        Size:            14215163 blocks
        Geometry (C/H/S): ( 4206 / 20 / 169 )
        NOHOST_REDUNDANT
  D2                                         S1           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02B4
        IDENTIFIER = 2
        Switches:
          RUN                   NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE       WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to the other controller
          PREFERRED_PATH = OTHER_CONTROLLER
        Size:            14215163 blocks
        Geometry (C/H/S): ( 4206 / 20 / 169 )
        NOHOST_REDUNDANT
  D3                                         S1           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02B5
        IDENTIFIER = 3
        Switches:
          RUN                   NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE       WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to the other controller
          PREFERRED_PATH = OTHER_CONTROLLER
        Size:            14215163 blocks
        Geometry (C/H/S): ( 4206 / 20 / 169 )
        NOHOST_REDUNDANT
```

```
D4                                        S1           (partition)
      LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02B6
      IDENTIFIER = 4
      Switches:
        RUN                      NOWRITE_PROTE
        READAHEAD_CACHE          WRITEBACK_CAC
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
      Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              14215163 blocks
      Geometry (C/H/S): ( 4206 / 20 / 169 )
      NOHOST_REDUNDANT
  D5                                        S
      LUN ID:      6000-1FE1-0001-E200-0001-
      IDENTIFIER = 5
      Switches:
        RUN                      NOWRITE_PROTE
        READAHEAD_CACHE          WRITEBACK_CAC
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
      Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              14215163 blocks
      Geometry (C/H/S): ( 4206 / 20 / 169 )
      NOHOST_REDUNDANT
  D6                                        S
      LUN ID:      6000-1FE1-0001-E200-0001-
      IDENTIFIER = 6
      Switches:
        RUN                      NOWRITE_PROTE
        READAHEAD_CACHE          WRITEBACK_CAC
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
      Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              10661371 blocks
      Geometry (C/H/S): ( 3155 / 20 / 169 )
      NOHOST_REDUNDANT
  D7                                        S
      LUN ID:      6000-1FE1-0001-E200-0001-
      IDENTIFIER = 7
      Switches:
        RUN                      NOWRITE_PROTE
        READAHEAD_CACHE          WRITEBACK_CAC
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
```

```
Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              10661371 blocks
      Geometry (C/H/S): ( 3155 / 20 / 169 )
      NOHOST_REDUNDANT
  D8                                        S2           (partition)
      LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02BF
      IDENTIFIER = 8
      Switches:
        RUN                      NOWRITE_PROTECT        READ_CACHE
        READAHEAD_CACHE          WRITEBACK_CACHE
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
      Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              10661371 blocks
      Geometry (C/H/S): ( 3155 / 20 / 169 )
      NOHOST_REDUNDANT
  D9                                        S2           (partition)
      LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02C0
      IDENTIFIER = 9
      Switches:
        RUN                      NOWRITE_PROTECT        READ_CACHE
        READAHEAD_CACHE          WRITEBACK_CACHE
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
      Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              10661371 blocks
      Geometry (C/H/S): ( 3155 / 20 / 169 )
      NOHOST_REDUNDANT
  D10                                       S2           (partition)
      LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02C1
      IDENTIFIER = 10
      Switches:
        RUN                      NOWRITE_PROTECT        READ_CACHE
        READAHEAD_CACHE          WRITEBACK_CACHE
        MAX_READ_CACHED_TRANSFER_SIZE = 32
        MAX_WRITE_CACHED_TRANSFER_SIZE = 32
      Access:
              ALL
      State:
        ONLINE to the other controller
        PREFERRED_PATH = OTHER_CONTROLLER
      Size:              10661371 blocks
      Geometry (C/H/S): ( 3155 / 20 / 169 )
      NOHOST_REDUNDANT
```

```
D110                                      S3           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02C7
        IDENTIFIER = 110
        Switches:
          RUN                      NOWRITE_PROT
          READAHEAD_CACHE          WRITEBACK_CA
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D120
        LUN ID:      6000-1FE1-0001-E200-0001
        IDENTIFIER = 120
        Switches:
          RUN                      NOWRITE_PROT
          READAHEAD_CACHE          WRITEBACK_CA
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D130
        LUN ID:      6000-1FE1-0001-E200-0001
        IDENTIFIER = 130
        Switches:
          RUN                      NOWRITE_PROT
          READAHEAD_CACHE          WRITEBACK_CA
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
D140                                      S3
        LUN ID:      6000-1FE1-0001-E200-0001
        IDENTIFIER = 140
        Switches:
          RUN                      NOWRITE_PROT
          READAHEAD_CACHE          WRITEBACK_CA
```

```
MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D150                                    S3           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02CB
        IDENTIFIER = 150
        Switches:
          RUN                      NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE          WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D160                                    S4           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02D1
        IDENTIFIER = 160
        Switches:
          RUN                      NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE          WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D170                                    S4           (partition)
        LUN ID:      6000-1FE1-0001-E200-0001-1234-5678-02D2
        IDENTIFIER = 170
        Switches:
          RUN                      NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE          WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
```

```
State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D180                                           S
        LUN ID:      6000-1FE1-0001-E200-0001-
        IDENTIFIER = 180
        Switches:
          RUN                    NOWRITE_PROTE
          READAHEAD_CACHE        WRITEBACK_CAC
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D190                                           S
        LUN ID:      6000-1FE1-0001-E200-0001-
        IDENTIFIER = 190
        Switches:
          RUN                    NOWRITE_PROTE
          READAHEAD_CACHE        WRITEBACK_CAC
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
  D199                                           S
        LUN ID:      6000-1FE1-0001-E200-0001-
        IDENTIFIER = 199
        Switches:
          RUN                    NOWRITE_PROTE
          READAHEAD_CACHE        WRITEBACK_CAC
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
```

```
Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             10661371 blocks
        Geometry (C/H/S): ( 3155 / 20 / 169 )
        NOHOST_REDUNDANT
hsg80_bot>
```

SHOW EMU

Displays information regarding the status of the environmental monitoring unit (EMU).

Syntax

```
SHOW EMU
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW EMU` command:

FULL

Provides additional details regarding the EMU.

SHOW FAILEDSETS

Displays a list of devices in the failedset.

Syntax

```
SHOW FAILEDSETS
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

```
BOT> show failedset

Name          Storageset                     Uses             Used by
------------------------------------------------------------------
FAILEDSET     failedset                      DISK10000
        Switches:
      NOAUTOSPARE
```

Figure 20: Screen display after issuing the SHOW FAILEDSET command

See Also

DELETE FAILEDSETS
SET FAILEDSET
SHOW SPARESETS

SHOW ID

Displays a sorted list of any unit associated with an ID. If no units are associated with an ID, the informational message, `No Units with Identifiers`, is displayed.

Syntax

```
SHOW ID
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

To display a list of units associated with IDs, enter:

```
SHOW ID

 Unit       ID
 ----       ---

 D0         12
 D3         9
 D7         24
 D25        90
 D123       1
```

See Also

SET *unit-number*

SHOW MANAGERS

Displays a list of host connections with management rights. A manager is a host connection that is allowed to issue CLI commands through a LUN. By default all host connections are enabled as managers. Manager status has no effect on CLI commands issued through the maintenance port of the controller.

Syntax

```
SHOW MANAGERS
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Examples

```
G80> SHOW MANAGERS
Connection                 <<<All Connections Enabled>>>
Name         Operating     Controller   Port    Address       Status
             System
!NEWCON14    AIX           THIS         1       011000        0
   HOST_ID=2000-0000-C922-46E2      ADAPTER_ID=1000-0000-C922-46E2
!NEWCON15    WINNT         THIS         1       011200        0
   HOST_ID=2000-0000-C927-6735      ADAPTER_ID=1000-0000-C927-6735
!NEWCON16    AIX           OTHER        1       011100        0
   HOST_ID=2000-0000-C925-0096      ADAPTER_ID=1000-0000-C925-0096
!NEWCON17    WINNT         OTHER        1       011300        0
   HOST_ID=2000-0000-C923-2CD2      ADAPTER_ID=1000-0000-C923-2CD2
                           <<<All Connections Enabled>>>
```

See Also

SET DISABLE_MANAGERS
SET ENABLE_MANAGERS

SHOW *mirrorset-name*

Displays information about the specified mirrorset.

Syntax

`SHOW` *`mirrorset-name`*

Parameters

The following parameter supports the `SHOW` command:

mirrorset-name

Specifies the name of the mirrorset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show M1

Name          Storageset                    Uses             Used by
------------------------------------------------------------------

M1            mirrorset                     DISK10000        S1
                                            DISK20000
                                            DISK20400
        Switches:
          POLICY (for replacement) = BEST_PERFORMANCE
          COPY (priority) = NORMAL
          READ_SOURCE = LEAST_BUSY
          MEMBERSHIP = 3, 3 members present
        State:
          RECONSTRUCTING
          DISK20000 (member  0) is NORMAL
          DISK20400 (member  1) is NORMAL
          DISK10000 (member  2) is COPYING   6% complete
     Size:            71114623 blocks
```

Figure 21: Screen display after issuing the SHOW mirrorset-name command

See Also

ADD MIRRORSETS
DELETE *container-name*
SHOW MIRRORSETS
SHOW STRIPESETS

SHOW MIRRORSETS

Displays information about all mirrorsets known to the subsystem.

Syntax

`SHOW MIRRORSETS`

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW MIRRORSETS` command:

FULL

Provides additional details regarding subsystem mirrorsets.

Example

```
BOT> show mirrorset
Name              Storageset                  Uses              Used by
------------------------------------------------------------------------------
M1                mirrorset                   DISK10000         S1
                                              DISK20000
                                              DISK20400
M2                mirrorset                   DISK10100         S1
                                              DISK20100
                                              DISK30100
```

Figure 22: Screen display after issuing the SHOW MIRRORSETS command

See Also

ADD MIRRORSETS
DELETE *container-name*
SHOW *mirrorset-name*
SHOW STRIPESETS

SHOW PASSTHROUGH

Displays information about all passthrough devices known to the subsystem.

Syntax

```
SHOW PASSTHROUGH
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW PASSTHROUGH` command:

FULL

Provides additional details regarding subsystem passthrough devices.

See Also

`ADD PASSTHROUGH`
`DELETE` *`container-name`*

SHOW *raidset-name*

Displays information about the specified RAIDset.

Syntax

```
SHOW raidset-name
```

Parameters

The following parameter supports the `SHOW` command:

raidset-name

Specifies the name of the RAIDset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show R0
Name          Storageset                     Uses             Used by
------------------------------------------------------------------
R0            raidset                        DISK10400        D0
                                             DISK20500
                                             DISK30000
        Switches:
          NOPOLICY (for replacement)
          RECONSTRUCT (priority) = NORMAL
          CHUNKSIZE = 256 blocks
        State:
          RECONSTRUCT 3% complete
          DISK10400 (member  0) is RECONSTRUCTING   3% complete
          DISK20500 (member  1) is RECONSTRUCTING   3% complete
          DISK30000 (member  2) is RECONSTRUCTING   3% complete
        Size:             35529666 blocks
```

Figure 23: Screen display after issuing the SHOW raidset-name command

See Also

ADD RAIDSETS
DELETE *container-name*
SET *RAIDset-name*
SHOW RAIDSETS

SHOW RAIDSETS

Displays information about all RAIDsets and RAIDset containers known to the subsystem.

Syntax

```
SHOW RAIDSETS
```

Parameters

There are no parameters associated with this command.

Switches

The following switches support the `SHOW RAIDSETS` command:

- *FULL*
- *SPECIAL_FUNCTION_ONE*

These switches are described in the following paragraphs.

FULL

Provides additional details regarding subsystem RAIDsets.

SPECIAL_FUNCTION_ONE

Displays a listing of all RAIDset containers and either one of three possible container statuses: `Good`, `Maintenance Recommended`, or `REPORTED ON THE OTHER CONTROLLER`.

Note: Refer to information regarding after upgrade maintenance checks in the *HP StorageWorks Array Controller and Array Controller Software Maintenance and Service Guide*.

Example

```
BOT> show raidsets full
Name          Storageset                    Uses            Used by
------------------------------------------------------------------
R0            raidset                       DISK10400       D0
                                            DISK20500
                                            DISK30000
        Switches:
          NOPOLICY (for replacement)
          RECONSTRUCT (priority) = NORMAL
          CHUNKSIZE = 256 blocks
        State:
          RECONSTRUCT 3% complete
          DISK10400 (member  0) is RECONSTRUCTING   3% complete
          DISK20500 (member  1) is RECONSTRUCTING   3% complete
          DISK30000 (member  2) is RECONSTRUCTING   3% complete
     Size:             35529666 blocks
```

Figure 24: Screen display after issuing the SHOW RAIDSETS FULL command

```
BOT> show raidsets special_function_one
Name          Status                        Used by
R1            GOOD                            D11
                                              D12
                                              D13
R2            REPORTED ON OTHER CONTROLLER    D2
R3            GOOD                            D3
R4            REPORTED ON OTHER CONTROLLER    D4
R5            MAINTENANCE RECOMMENDED
R6            REPORTED ON OTHER CONTROLLER
R21           GOOD                            D21
R31           GOOD                            D31
```

Figure 25: Screen display after issuing the SHOW RAIDSETS SPECIAL_FUNCTION_ONE command

See Also

ADD RAIDSETS
DELETE *container-name*
SET *RAIDset-name*
SHOW *raidset-name*

SHOW REMOTE_COPY_SETS

Displays information on all remote copy sets known to the subsystem.

Syntax

`SHOW REMOTE_COPY_SETS`

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW REMOTE_COPY_SETS` command:

FULL

Provides additional details regarding remote copy sets.

Example

```
INT_TOP> show remote_copy_sets

Name                                               Uses              Used by
-------------------------------------------------------------------
RCS1           remote copy                         D1                A1
RCS2           remote copy                         D2                A1
RCS3           remote copy                         D3                A1
RCS4           remote copy                         D4                A1
```

Figure 26: Screen display after issuing the SHOW REMOTE_COPY_SETS command

See Also

ADD ASSOCIATIONS
ADD REMOTE_COPY_SETS
DELETE *remote-copy-set-name*

```
SET remote-copy-set-name
SHOW ASSOCIATIONS
SHOW controller
SHOW remote-copy-set-name
```

SHOW *remote-copy-set-name*

Displays information on the specified remote copy set.

Syntax

```
SHOW remote-copy-set-name
```

Parameters

The following parameter supports the `SHOW` command:

remote-copy-set-name

Specifies the name of the remote copy set to be displayed.

Switches

There are no switches associated with this command.

Example

```
INT_TOP> show RCS1

Name                                           Uses             Used by
------------------------------------------------------------------
RCS1          remote copy                      D1               A1
        Reported LUN ID: 6000-1FE1-FF00-0090-0001-0010-3889-05C0
        Switches:
          OPERATION_MODE  = SYNCHRONOUS
          ERROR_MODE      = NORMAL
          FAILOVER_MODE   = MANUAL
          OUTSTANDING_IOS = 200
        Initiator (INT\D1) state:
          ONLINE to this controller
          Not reserved
        Target state:
          TGT\D1           is NORMAL
```

Figure 27: Screen display after issuing the SHOW remote-copy-set-name command

See Also

ADD ASSOCIATIONS
ADD REMOTE_COPY_SETS
DELETE *remote-copy-set-name*
SET *remote-copy-set-name*
SHOW ASSOCIATIONS
SHOW *controller*
SHOW REMOTE_COPY_SETS

SHOW SPARESETS

Displays information on all devices in the spareset.

Syntax

```
SHOW SPARESETS
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

```
BOT> show spareset

Name          Storageset                     Uses             Used by
------------------------------------------------------------------
SPARESET      spareset                       DISK30400
```

Figure 28: Screen display after issuing the SHOW SPARESETS command

See Also

ADD SPARESETS
DELETE SPARESETS
SHOW FAILEDSETS

SHOW STORAGESETS

Specifies the name of a particular storageset to be displayed. For example, `SHOW STRIPE1` displays information about the stripeset named *STRIPE1*.

Specifies the type of storageset to be displayed. Valid types include:

- *CONCATSETS*—Shows all concatsets configured to the controller.
- *FAILEDSETS*—Shows the failedset configured to the controller.
- *MIRRORSETS*—Shows all mirrorsets configured to the controller.
- *RAIDSETS*—Shows all RAIDsets configured to the controller.
- *SPARESETS*—Shows the sparesets configured to the controller.
- *STORAGESETS*—Shows all storagesets configured with the controller.
- *STRIPESETS*—Shows all stripesets configured to the controller.

Syntax

```
SHOW STORAGESETS
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW STORAGESETS` command:

FULL

Provides additional details regarding subsystem storagesets.

Example

```
show storagesets

Name           Storageset                     Uses               Used by
-----------------------------------------------------------------
S1             stripeset                      M1                 D4
                                              M2

M1             mirrorset                      DISK10000          S1
                                              DISK20000
                                              DISK20400
M2             mirrorset                      DISK10100          S1
                                              DISK20100
                                              DISK30100

SPARESET       spareset

FAILEDSET      failedset
```

Figure 29: Screen display after issuing the SHOW STORAGESETS command

See Also

ADD DISKS
ADD MIRRORSETS
ADD RAIDSETS
DELETE *container-name*
SHOW DISKS
SHOW MIRRORSETS
SHOW RAIDSETS
SHOW *unit-number*

SHOW stripeset-name

Displays information about the specified stripeset.

Syntax

```
SHOW stripeset-name
```

Parameters

The following parameter supports the `SHOW` command:

stripeset-name

Specifies the name of the stripeset to be displayed.

Switches

There are no switches associated with this command.

Example

```
BOT> show S1

Name          Storageset                      Uses             Used by
------------------------------------------------------------------
S1            stripeset                       M1               D4
                                              M2
        Switches:
          CHUNKSIZE = 256 blocks
        State:
          NORMAL
          M1        (member  0) is NORMAL
          M2        (member  1) is NORMAL
     Size:              142229246 blocks
```

Figure 30: Screen display after issuing the SHOW stripeset-name command

See Also

ADD STRIPESETS
DELETE *container-name*
SHOW STRIPESETS

SHOW STRIPESETS

Displays information about all stripesets known to the subsystem.

Syntax

```
SHOW STRIPESETS
```

Parameters

There are no parameters associated with this command.

Switches

The following switch supports the `SHOW STRIPESETS` command:

FULL

Provides additional details regarding subsystem stripesets.

Example

```
BOT> show stripesets
Name                Storageset                    Uses                Used by
------------------------------------------------------------------------------
S1                  stripeset                     M1                  D4
                                                  M2
```

Figure 31: Screen display after issuing the SHOW STRIPESETS command

See Also

ADD STRIPESETS
DELETE *container-name*
SHOW *stripeset-name*

SHOW *unit-number*

Displays information about the specified unit.

Syntax

```
SHOW unit-number
```

Parameters

The following parameter supports the `SHOW` command:

unit-number

Specifies the unit to be displayed.

Switches

There are no switches associated with this command.

Example

```
HSG_TOP> SHOW D40
    LUN                                           Uses             Used by
--------------------------------------------------------------------------
D40                                             R0
        LUN ID:      6000-1FE1-FF1C-2BF0-0009-9471-1788-0410
        IDENTIFIER = 1040
        Switches:
          RUN                   NOWRITE_PROTECT        READ_CACHE
          READAHEAD_CACHE       WRITEBACK_CACHE
          MAX_READ_CACHED_TRANSFER_SIZE = 32
          MAX_WRITE_CACHED_TRANSFER_SIZE = 32
        Access:
                ALL
        State:
          ONLINE to this controller
          Not reserved
          PREFERRED_PATH = THIS_CONTROLLER
        Size:             16344 blocks
        Geometry (C/H/S): ( 87 / 10 / 19 )
        NOHOST_REDUNDANT
```

Figure 32: Screen display after the SHOW unit-number command is submitted

See Also

ADD UNITS
DELETE *unit-number*
SET *unit-number*

SHUTDOWN *controller*

Flushes all user data from the writeback cache (if present) of the specified controller and shuts down the controller. The controller *does not* automatically restart. All units accessed through the failed controller failover to the surviving controller.

Syntax

```
SHUTDOWN controller
```

Parameter

The following parameter supports the SHUTDOWN command:

controller

Identifies the controller to shut down. You must specify THIS_CONTROLLER (the one connected to the CLI maintenance terminal) or OTHER_CONTROLLER.

Switches

The following switches support the SHUTDOWN *controller* command:

- *IGNORE_ERRORS* and *NOIGNORE_ERRORS*
- *IMMEDIATE_SHUTDOWN* and *NOIMMEDIATE_SHUTDOWN*

These switches are described in the following paragraphs.

IGNORE_ERRORS
NOIGNORE_ERRORS (default)

Controls the controller reaction based on the status of writeback cache.

Caution: The *IGNORE_ERRORS* switch causes the controller to keep unflushed data in the writeback cache until it restarts and is able to write the data to devices. Do not perform any hardware changes until the controller flushes the cache.

- Specify *IGNORE_ERRORS* to instruct the controller to shut down even if the data within writeback cache cannot be written to the devices.
- Specify *NOIGNORE_ERRORS* to instruct the controller to stop operation if the data within writeback cache cannot be written to the devices.

IMMEDIATE_SHUTDOWN
NOIMMEDIATE_SHUTDOWN (default)

Instructs the controller when to shut down.

Caution: The *IMMEDIATE_SHUTDOWN* switch causes the controller to keep unflushed data in the writeback cache until it restarts and is able to write the data to devices. Do not perform any hardware changes until the controller flushes the cache.

- Specify *IMMEDIATE_SHUTDOWN* to cause the controller to shut down immediately without checking for online devices or before flushing data from the writeback cache to devices.
- Specify *NOIMMEDIATE_SHUTDOWN* to cause the controller not to shut down without checking for online devices or before all data is flushed from the writeback cache to devices.

Examples

To shut down “this controller,” enter:

```
SHUTDOWN THIS_CONTROLLER
```

To shut down the “other controller,” even if the controller cannot write all of the writeback cached data to the units, enter:

```
SHUTDOWN OTHER_CONTROLLER IGNORE_ERRORS
```

See Also

RESTART *controller*
SELFTEST

SITE_FAILOVER

Performs the site failover function in the event the original initiator site is not operational.

Note: This command works only in a DRM environment and requires an HSG80 controller with ACS V8.8-*x*P. Use of this command is heavily restricted. Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application for an explanation and examples of usage.

The `SITE_FAILOVER` command changes the role of a target unit to an initiator unit. A remote copy set is created with two members:

- Original target (which is the new initiator)
- Original initiator (which is the new target)

Syntax

`SITE_FAILOVER` *`remote-node-name`*`\`*`remote-copy-set-name`*

Parameters

The following parameter supports the `SITE_FAILOVER` command:

remote-node-name
remote-copy-set-name

The *`remote-node-name`* part of the parameter specifies the name of the controller pair—called a node—receiving the command.

The *`remote-copy-set-name`* part of the parameter specifies the name by which the remote copy set is known. This name must be unique across the fabric.

Note: Remote copy sets cannot be renamed with the `RENAME` command. If the wrong name is entered, the remote copy set must be deleted and then added again.

The `remote-copy-set-name` must start with RCS and can consist of a maximum of 9 characters including letters A through Z, numbers 0 through 9, periods (.), dashes (-), or underscores (_).

Switches

There are no switches associated with this command.

Examples

Refer to the latest version of the Operations Guide for the HP StorageWorks Data Replication Manager application.

UNMIRROR

Converts a one-member mirrorset back to a nonmirrored disk drive and deletes the mirrorset from the list of known mirrorsets. This command can only be used on mirrorsets already members of higher-level containers (stripesets or units).

The `UNMIRROR` command is not valid for disk drives having a capacity greater than the capacity of the existing mirrorset. If a mirrorset is comprised of disk drives with different capacities, the mirrorset capacity is limited to the size of the smallest member; larger members contain unused capacity. If a member with unused capacity is the last remaining member of a mirrorset, the `UNMIRROR` command cannot be used to change the disk drive back to a single-disk unit. This change would cause a change in the reported disk capacity, possibly corrupting user data.

Syntax

`UNMIRROR` *`disk-name`*

Parameters

The following parameter supports the `UNMIRROR` command:

disk-name

Specifies the name of the normal mirrorset member to be removed from a mirror storageset.

Switches

There are no switches associated with this command.

Example

To convert DISK10300 back to a single device, enter:

```
UNMIRROR DISK10300
```

See Also

ADD MIRRORSETS
MIRROR
REDUCE
RUN
SET *mirrorset-name*

WWID_ASSIGN *storageset* LUN_WWID=

Allows you to assign a WWID number to a valid storageset. The `ASSIGN` `<storage set>` `LUN_WWID=` command cannot be used under the following circumstances:

- On concatenated sets
- If an uninitialized container is specified
- If a duplicate WWID is being specified that exists in this subsystem
- If trying to assign a WWID to a unit
- If trying to assign a WWID to a transportable disk
- If trying to assign a WWID on a partitioned container
- If trying to assign a WWID on a concatenated set

Note: If you had a previous unit under a known WWID address on the controller, you can assign the previous WWID address to a different or new unit if:

- The base WWID is for the current controller pair.
- The WWID that is entered is *not* currently duplicated on the controller.

Note: If you are running ACS V8.8-*x*P (DRM) and operating under the condition of a site failover and wanting to make the assignment of a remote copy set unit (as presented to the host) of a WWID in the range of the initiator site WWID, you can do so if the following conditions are met:

- The unit is assigned a WWID that is different than the base WWID for the controller pair is an RCS unit.
- ACS V8.8-*x*P is the operating firmware on your subsystem.

Syntax

```
WWID_ASSIGN storageset LUN_WWID=
```

Parameters

There are no parameters associated with this command.

Switches

There are no switches associated with this command.

Example

Assign a WWID by entering it in the *xxxx-xxxx-xxxx-xxxx-xxxx* format.

Note: After you assign the WWID, `6000-1FE1` is added to the beginning of the LUN WWID specified.

---

glossary

This glossary defines terms used in this guide or related to this product and is not a comprehensive glossary of computer terms.

ACS
Array Controller Software. The software component of the HS-series controller storage systems. ACS executes on the controller and processes input/output requests from the host, performing the device-level operations required to satisfy the requests.

adapter
A device that converts the protocol and hardware interface of one bus type into that of another without changing functionality of the bus.

AL_PA
Arbitrated loop physical address. A one-byte value used to identify a port in an Arbitrated Loop topology.

ANSI
Pronounced "ann-see." Acronym for the American National Standards Institute. An organization who develops standards used voluntarily by many manufacturers within the USA. ANSI is not a government agency.

arbitrated loop
In Fibre Channel Technology, a serial bus configuration in which device ports are connected in a loop. Each port has a unique loop address and it communicates with other ports on the loop by arbitrating for loop access. Loop addresses are assigned via cooperative port intercommunication during loop initialization, which occurs any time the device configuration on the loop is physically changed.

arbitrated loop physical address
See AL_PA

array controller
See controller

Array Controller Software
See ACS

association set
A group of remote copy sets that share selectable attributes for failover. Members of an association set transition to the same state simultaneously. For example, if one association set member assumes the failsafe locked condition, then other members of the association set also assume the failsafe locked condition. An association set can also be used to share a log between a group of remote copy set members that require efficient use of the log space. *See also* remote copy set.

asynchronous
Pertaining to events that are scheduled as the result of a signal asking for the event; pertaining to that which is without any specified time relation. *See also* synchronous.

autospare
A controller feature that automatically replaces a failed disk drive. Autospare aids the controller in automatically replacing failed disk drives. You can enable the *AUTOSPARE* switch for the failedset causing physically replaced disk drives to be automatically placed into the spareset. *Also called* autonewspare.

backplane
The electronic printed circuit board into which you plug subsystem devices—for example, a controller or power supply.

bad block
A data block containing a physical defect.

bad block replacement
See BBR

battery hysteresis
The ability of the software to allow writeback caching during the time a battery is charging, but only a previous down time has not drained more than 50 percent of rated battery capacity.

BBR
Bad Block Replacement. A replacement routine that substitutes defect-free disk blocks for those found to have defects. This process takes place in the controller, transparent to the host.

BIST
Built-in self-test. A diagnostic test performed by the controller software on the controller's policy processor.

bit
A single binary digit having a value of either 0 or 1. A bit is the smallest unit of data a computer can process.

block
A number of consecutive bytes of data stored on a storage device. In most storage systems, a block is the same size as a physical disk sector. *Also called* sector.

bootstrapping
A method used to bring a system or device into a defined state by means of its own action. For example, a machine routine whose first few instructions are enough to bring the rest of the routine into the computer from an input device.

built-in self-test
See BIST

byte
A binary character string made up of 8 bits operated on as a unit.

cache memory
A portion of memory used to accelerate read and write operations. The objective of caching data in a system is to improve performance by placing the most frequently used data in the highest performance memory.

CDU
Cable distribution unit. The power entry device for HP StorageWorks racks (cabinets). The CDU provides the connections necessary to distribute power to the rack enclosures and fans.

channel
An interface which allows high speed transfer of large amounts of data. Another term for a SCSI bus. *See also* SCSI.

chunk
In any form of RAID that stripes data, data is stored in pieces called chunks. One chunk is stored on each member device in the unit. Taken together, the chunks make up a stripe. The chunk size can be used in some controllers to tune the stripeset for a specific application.

chunk size
The number of data blocks, assigned by a system administrator, written to the primary RAIDset or stripeset member before the remaining data blocks are written to the next RAIDset or stripeset member.

CI bus
Computer Interconnect bus. A serial 70 MHz, dual path, party-line, bus. It is the host bus for the HSJ-series controller-based storage systems. The CI bus is used by OpenVMS hosts to connect the nodes in a clustered subsystem.

CLCP
Code-Load Code-Patch utility. This utility can be used to download patches to ACS.

CLI
Command Line Interface. A command line entry utility used to interface with the HS-series controllers. CLI enables the configuration and monitoring of a storage subsystem through textual commands.

coax or coaxial cable
A two-conductor wire in which one conductor completely wraps the other with the two separated by insulation.

code-load code-patch utility
See CLCP

Command Line Interface
See CLI

computer interconnect bus
See CI bus

configuration file
A file that contains a representation of a storage subsystem configuration.

container
Any entity that is capable of storing data, whether it is a physical device or a group of physical devices. (2) A virtual, internal controller structure representing either a single disk or a group of disk drives linked as a storageset. Stripesets and mirrorsets are examples of storageset containers that the controller uses to create units.

See also storage unit.

controller
A hardware device that, with proprietary software, facilitates communications between a host and one or more storage devices organized in a storage array. The HS-series of the HP StorageWorks family of controllers are all array controllers.

copying
A state in which data to be copied to the mirrorset is inconsistent with other members of the mirrorset. *See also* normalizing.

copying member
Any member that joins the mirrorset after the mirrorset is created is regarded as a copying member. After all the data from the normal member (or members) is copied to a normalizing or copying member, the copying member then becomes a normal member. *See also* normalizing member.

CSR
Control and Status Register.

DAEMON
Pronounced "demon." A program usually associated with a UNIX system that performs a utility (housekeeping or maintenance) function without being requested or even known of by the user. A daemon is a diagnostic and execution monitor.

data center cabinet (rack)
A generic reference to large subsystem racks, such as those in which HP StorageWorks products can be mounted.

data striping
The process of segmenting logically sequential data, such as a single file, so that segments can be written to multiple physical devices (usually disk drives) in a round-robin fashion. This technique is useful if the processor is capable of reading or writing data faster than a single disk can supply or accept the data. While data is being transferred from the first disk, the second disk can locate the next segment.

DDL
Dual data link. The ability to operate on the CI bus using both paths simultaneously to the same remote node.

device
In its physical form, a magnetic disk that can be attached to a SCSI bus. The term is also used to indicate a physical device that is made part of a controller configuration; that is, a physical device that is known to the controller. Units (virtual disks) can be created from devices, after the devices are made known to the controller.

The targets, initiators, hubs, converters, adapters, and similar items interconnected to form a SCSI bus. Connectors, expanders, and hubs do not use a SCSI bus ID. *See also* node; peripheral device.

differential I/O module
A 16-bit I/O module with SCSI bus converter circuitry for extending a differential SCSI bus. *See also* I/O module.

differential SCSI bus
A bus in which a signal level is determined by the potential difference between two wires. A differential bus is more robust and less subject to electrical noise than is a single-ended bus.

DILX
Disk Inline Exerciser. DILX is a diagnostic used to test the data transfer capabilities of disk drives in a way that simulates a high level of user activity.

DIMM
Dual Inline Memory Module.

dirty data
The writeback cached data that has not been written to storage media, even though the host operation processing the data has completed.

disaster tolerance
The ability to resume data center operations shortly after a significant event occurs at the primary data center. The ability to restart processing can require an alternate data center, with current copies of critical data in a usable state.

disk inline exerciser
See DILX

DMA
Direct Memory Access.

DOC
DWZZA-on-a-chip. An SYM53C120 SCSI bus extender chip used to connect a SCSI bus in one enclosure to the corresponding SCSI bus in another enclosure.

driver
A hardware device or a program that controls or regulates another device. For example, a device driver is a driver developed for a specific device that allows a computer to operate with the device, such as a printer or a disk drive.

dual data link
See DDL

dual-redundant configuration
A controller configuration consisting of two active controllers operating as a single controller. If one controller fails, the other controller assumes control of the failing controller devices.

dual-simplex
A communications protocol that allows simultaneous transmission in both directions in a link, usually with no flow control.

DUART
Dual Universal Asynchronous Receiver and Transmitter. An integrated circuit containing two serial, asynchronous transceiver circuits.

DWZZA
An HP StorageWorks SCSI-bus-signal converter used to connect 8-bit single-ended devices to hosts with 16-bit differential SCSI adapters. This converter extends the range of a single-ended SCSI cable to the limit of a differential SCSI cable. *See also* SCSI bus signal converter.

DWZZB
An HP StorageWorks SCSI bus signal converter used to connect a variety of 16-bit single-ended devices to hosts with 16-bit differential SCSI adapters. *See also* SCSI bus signal converter.

DWZZC
The 16-bit SCSI table-top SCSI bus signal converter used to extend a differential SCSI bus, or to connect a differential SCSI bus to a single-ended SCSI bus. *See also* SCSI bus signal converter.

ECB
External Cache Battery. The unit that supplies backup power to the cache module in the event the primary power source fails or is interrupted.

EIA
Electronic Industries Association. EIA is a standards organization specializing in the electrical and functional characteristics of interface equipment.

EMU
Environmental Monitoring Unit. A unit that provides increased protection against catastrophic failures. Some subsystem enclosures include an EMU which works with the controller to detect conditions such as failed power supplies, failed blowers, elevated temperatures, and external air sense faults. The EMU also controls certain cabinet hardware including alarms and fan speeds.

environmental monitoring unit
See EMU

ESD
Electrostatic Discharge. The discharge of potentially harmful static electrical voltage as a result of improper grounding.

extended subsystem
A subsystem in which one or two enclosures are connected to the primary enclosure.

external cache battery
See ECB

F_Port
A port in a fabric where an N_Port or NL_Port may attach.

fabric
A group of interconnections between ports that includes a fabric element.

failback
The process of restoring data access to the newly-restored controller in a dual-redundant controller configuration. *See also* failover.

failedset

A group of disk drives that are removed from RAIDsets due to a failure or a manual removal. Disk drives in the failedset should be considered defective and should be tested and repaired before being placed back into the spareset. *See also* spareset.

failover

The process that takes place one controller in a dual-redundant configuration assumes the workload of a failed companion controller. Failover continues until the failed controller is repaired or replaced. *See also* failback.

fault management utility

See FMU

FC–AL

The Fibre Channel Arbitrated Loop standard.

FC–ATM

ATM AAL5 over Fibre Channel.

FCC

Federal Communications Commission. The federal agency responsible for establishing standards and approving electronic devices within the United States.

FCC Class A

This certification label appears on electronic devices that can only be used in a commercial environment within the United States.

FCC Class B

This certification label appears on electronic devices that can be used in either a home or a commercial environment within the United States.

FC–FG

Fibre Channel Fabric Generic requirements.

FC-GS-1

Fibre Channel Generic Services-1.

FC–GS-2

Fibre Channel Generic Services-2.

FC–IG

Fibre Channel Implementation Guide.

FC–LE

Fibre Channel Link Encapsulation (ISO 8802.2).

FCP

The mapping of SCSI-3 operations to Fibre Channel.

FC–PH specification
The Fibre Channel Physical and Signaling standard.

FC–SB
Fibre Channel Single Byte Command Code Set.

FC–SW
Fibre Channel Switched Topology and Switch Controls.

FD SCSI
The fast, narrow, differential SCSI bus with an 8-bit data transfer rate of 10 MB/s. *See also* FWD SCSI; SCSI.

FDDI
Fiber Distributed Data Interface. An ANSI standard for 100 megabaud transmission over fiber optic cable.

FG–FP
Fibre Channel Framing Protocol (HIPPI on FC).

fiber
A fiber or optical strand. Spelled *fibre* in Fibre Channel.

fiber optic cable
A transmission medium designed to transmit digital signals in the form of pulses of light. Fiber optic cable is noted for its properties of electrical isolation and resistance to electrostatic contamination.

FL_Port
A port in a fabric where N_Port or an NL_Port may be connected.

flush
The act of writing dirty data from cache to a storage media. *See also* dirty data.

FMU
Fault Management Utility. A utility that is run to provide fault or error reporting information.

forced errors
A data bit indicating that a corresponding logical data block contains unrecoverable data.

frame
An invisible unit used to transfer information in Fibre Channel.

FRU
Field Replaceable Unit. A hardware component that can be replaced at a customer location by HP authorized service providers.

FRUTIL
Field Replacement Utility.

full duplex (adj)
Pertaining to a communications method in which data can be transmitted and received at the same time.

full duplex (n)
A communications system in which there is a capability for 2-way transmission and acceptance between two sites at the same time.

FWD SCSI
A fast, wide, differential SCSI bus with a maximum 16-bit data transfer rate of 20 MB/s. *See also* SCSI; FD SCSI.

GBIC
Gigabit Interface Converter. The devices that are inserted into the ports of the Fibre Channel switch and that hold the Fibre Channel cables.

giga
A prefix indicating a billion (10^9) units, as in gigabaud or gigabyte.

gigabaud
An encoded bit transmission rate of one billion (10^9) bits per second.

gigabyte
A value normally associated with the storage capacity of a disk drive, meaning a billion (10^9) bytes. The decimal value 1024 is usually used for one thousand.

GLM
Gigabit Link Module.

half-duplex (adj)
Pertaining to a communications system in which data can be either transmitted or received but only in one direction at one time.

hard address
The AL_PA which an NL_Port attempts to acquire during loop initialization.

heterogeneous host support
Also called *noncooperating host support*.

HIPPI–FC
Fibre Channel over HIPPI.

host
The primary or controlling computer to which a storage subsystem is attached.

host adapter
A device that connects a host system to a SCSI bus. The host adapter usually performs the lowest layers of the SCSI protocol. This function may be logically and physically integrated into the host system.

host compatibility mode
A setting used by the controller to provide optimal controller performance with specific operating systems. This improves the controller performance and compatibility with the specified operating system.

hot disks
A disk containing multiple hot spots. Hot disks occur the workload is poorly distributed across storage devices which prevents optimum subsystem performance. *See also* hot spots.

hot spots
A portion of a disk drive frequently accessed by the host. Because the data being accessed is concentrated in one area, rather than spread across an array of disks providing parallel access, I/O performance is significantly reduced. *See also* hot disks.

hot-pluggable
A replacement method that allows normal I/O activity on a device bus to remain active during device removal and insertion. The device being removed or inserted is the only device that cannot perform operations during this process. *See also* pluggable.

HP StorageWorks
An HP brand name for a family of modular data storage products that allow customers to design and configure their own storage subsystems. Components include power, packaging, cabling, devices, controllers, and software. Customers can integrate devices and controllers in HP StorageWorks enclosures to form storage subsystems. HP StorageWorks systems include integrated devices and controllers to form storage subsystems.

HSUTIL
Format and Device Code Load Utility.

I/O
Refers to input and output functions.

I/O driver
The set of code in the kernel that handles the physical I/O to a device. This is implemented as a fork process. *Also called* driver.

I/O interface
See interface

I/O module
A device that integrates an enclosure with either an 8-bit single-ended SCSI bus, 16-bit single-ended SCSI bus, 16-bit differential SCSI bus, or Fibre Channel bus.

I/O operation
The process of requesting a transfer of data from a peripheral device to memory (or visa versa), the actual transfer of the data, and the processing and overlaying activity to make the request and transfer occur.

initiator
A SCSI device that requests an I/O process to be performed by another SCSI device, namely, the SCSI target. The controller is the initiator on the device bus. The host is the initiator on the host bus.

instance code
A 4-byte value displayed in most text error messages and issued by the controller a subsystem error occurs. The instance code indicates during software processing the error was detected.

interface
A set of protocols used between components, such as cables, connectors, and signal levels.

IPI
Intelligent Peripheral Interface. An ANSI standard for controlling peripheral devices by a host computer.

IPI-3 Disk
Intelligent Peripheral Interface Level 3 for Disk.

IPI-3 Tape
Intelligent Peripheral Interface Level 3 for Tape.

JBOD
Just a bunch of disks. A term used to describe a group of single-device logical units not configured into any other container type.

kernel
The most privileged processor access mode.

L_Port
A node or fabric port capable of performing Arbitrated Loop functions and protocols. NL_Ports and FL_Ports are loop-capable ports.

link
A connection between two Fibre Channel ports consisting of a transmit fibre and a receive fibre.

local connection
A connection to the subsystem, by way of the controller serial maintenance port, to a maintenance terminal or the host terminal. A local connection enables you to connect to one subsystem controller to perform maintenance tasks. *See also* maintenance terminal; local terminal.

local terminal
A terminal plugged into the EIA-423 maintenance port located on the front bezel of the controller. *See also* maintenance terminal; local connection.

logical bus
A single-ended bus connected to a differential bus by a SCSI bus signal converter.

logical unit
A physical or virtual device addressable through a target ID number. LUNs use their target's bus connection to communicate on the SCSI bus. *See also* unit; LUN.

logical unit number
See LUN

logon
Also called login. A procedure whereby a participant, either a person or network connection, is identified as being an authorized network participant.

loop
See arbitrated loop.

loop tenancy
The period of time between the following events: a port wins loop arbitration and the port returns to a monitoring state.

Loop_ID
A 7-bit value numbered contiguously from zero to 126-decimal and represent the 127 legal AL_PA values on a loop (not all of the 256 hex values are allowed as AL_PA values per FC-AL).

LUN
Logical Unit Number. A value that identifies a specific logical unit belonging to a SCSI target ID number. A number associated with a physical device unit during a task's I/O operations. Each task in the system must establish its own correspondence between logical unit numbers and physical devices. *See also* logical unit.

maintenance terminal
An EIA-423-compatible terminal used with the controller. This terminal is used to identify the controller, enable host paths, enter configuration information, and check the controller's status. The maintenance terminal is not required for normal operations. *See also* local terminal; local connection.

mass storage control protocol
See MSCP

Mbps
Approximately one million (10^6) bits per second—that is, megabits per second.

MBps
Approximately one million (10^6) bytes per second—that is, megabytes per second.

member
A container that is a storage element in a RAID array.

metadata
The data written to a disk for the purposes of controller administration. Metadata improves error detection and media defect management for the disk drive. It is also used to support storageset configuration and partitioning. Non transportable disks also contain metadata to indicate they are uniquely configured for HP StorageWorks environments. Metadata can be thought of as “data about data.”

mirrored writeback caching
A method of caching data that maintains two copies of the cached data. The copy is available if either cache module fails.

mirroring
The act of creating an exact copy or image of data.

mirrorset
See RAID level 1

MIST
Module Integrity Self-Test.

MSCP
Mass Storage Control Protocol. MSCP is the protocol by which blocks of information are transferred between the host and the subsystem controller on the CI bus.

multibus failover
Allows the host to control the failover process by moving the unit(s) from one controller to another.

N_Port
A port attached to a node for use with point-to-point topology or fabric topology.

network
A data communication, a configuration in which two or more terminals or devices are connected to enable information transfer.

NL_Port
A port attached to a node for use in all three topologies.

node
In data communications, the point at which one or more functional units connect transmission lines. In Fibre Channel, a device that has at least one N_Port or NL_Port.

nominal membership
The desired number of mirrorset members the mirrorset is fully populated with active devices. If a member is removed from a mirrorset, the actual number of members can fall below the “nominal” membership.

Non-L_Port
A node of fabric port that is not capable of performing the Arbitrated Loop functions and protocols. N_Ports and F_Ports are loop-capable ports.

non-participating mode
A mode within an L_Port that inhibits the port from participating in loop activities. L_Ports in this mode continue to retransmit received transmission words but are not permitted to arbitrate or originate frames. An L_Port in non-participating mode may or may not have an AL_PA. *See also* participating mode.

nonredundant controller configuration
(1) A single controller configuration. (2) A controller configuration that does not include a second controller.

normal member
A mirrorset member that, block-for-block, contains the same data as other normal members within the mirrorset. Read requests from the host are always satisfied by normal members.

normalizing
A state in which, block-for-block, data written by the host to a mirrorset member is consistent with the data on other normal and normalizing members. The normalizing state exists only after a mirrorset is initialized; therefore, no customer data is on the mirrorset.

normalizing member
A mirrorset member whose contents is the same as all other normal and normalizing members for data that is written since the mirrorset was created or lost cache data was cleared. A normalizing member is created by a normal member either all of the normal members fail or all of the normal members are removed from the mirrorset. *See also* copying member.

OCP
Operator control panel. The control and indicator panel associated with a controller. The OCP is mounted on the controller and is accessible to the operator

operator control panel
See OCP

other controller
The controller in a dual-redundant pair that is connected to the controller serving your current CLI session. *See also* this controller.

outbound fiber
One fiber in a link that carries information away from a port.

parallel data transmission
A data communication technique in which more than one code element (for example, bit) of each byte is sent or received simultaneously.

parity
A method of checking if binary numbers or characters are correct by counting the ONE bits. In odd parity, the total number of ONE bits must be odd; in even parity, the total number of ONE bits must be even. Parity information can be used to correct corrupted data. RAIDsets use parity to improve the availability of data.

parity bit
A binary digit added to a group of bits that checks to see if errors exist in the transmission.

parity check
A method of detecting errors data is sent over a communications line. With even parity, the number of ones in a set of binary data should be even. With odd parity, the number of ones should be odd.

parity RAID
See RAIDset

participating mode
A mode within an L_Port that allows the port to participate in loop activities. A port must have a valid AL_PA to be in participating mode.

partition
A logical division of a container represented to the host as a logical unit.

PCMCIA
Personal Computer Memory Card Industry Association. An international association formed to promote a common standard for PC card-based peripherals to be plugged into notebook computers. The card, commonly known as a PCMCIA card or program card, is about the size of a credit card. *See also* program card.

peripheral device
Any unit, distinct from the CPU and physical memory, that can provide the system with input or accept any output from it. Terminals, printers, tape drives, and disks are peripheral devices.

pluggable
A replacement method that allows the complete system to remain online during device removal or insertion. The system bus must be halted, or quiesced, for a brief period of time during the replacement procedure. *See also* hot-pluggable.

point-to-point connection
A network configuration in which a connection is established between two, and only two, terminal installations. The connection can include switching facilities.

port
In general terms, the port is: (1) A logical channel in a communications system. (2) The hardware and software used to connect a host controller to a communications bus, such as a SCSI bus or serial bus.

Regarding the controller, the port is: (1) The logical route for data in and out of a controller that can contain one or more channels, all of which contain the same type of data. (2) The hardware and software that connects a controller to a SCSI device.

port_name
A 64-bit unique identifier assigned to each Fibre Channel port. The Port_Name is communicated during the logon and port discovery process.

preferred address
The AL_PA which an NL_Port attempts to acquire first during initialization.

primary enclosure
The subsystem enclosure that contains the controllers, cache modules, external cache batteries, and the PVA module.

private NL_Port
An NL_Port which does not attempt login with the fabric and only communicates with NL_Ports on the same loop.

program card
The PCMCIA card containing the controller operating software. *See also* PCMCIA.

protocol
The conventions or rules for the format and timing of messages sent and received.

PTL
Port-Target-LUN. The controller method of locating a device on the controller device bus.

public NL_Port
An NL_Port that attempts login with the fabric and can observe the rules of either public or private loop behavior. A public NL_Port can communicate with both private and public NL_Ports.

PVA module
Power Verification and Addressing module.

RAID
Redundant array of independent disks. Represents multiple levels of storage access developed to improve performance or availability or both.

RAID level 0
A RAID storageset that stripes data across an array of disk drives. A single logical disk spans multiple physical disks, allowing parallel data processing for increased I/O performance. While the performance characteristics of RAID level 0 is excellent, this RAID level is the only one that does not provide redundancy. Raid level 0 storagesets are referred to as stripesets.

RAID level 0+1
A RAID storageset that stripes data across an array of disks (RAID level 0) and mirrors the striped data (RAID level 1) to provide high I/O performance and high availability. Raid level 0+1 storagesets are referred to as striped mirrorsets.

RAID level 1
A RAID storageset of two or more physical disks that maintains a complete and independent copy of the entire virtual disk's data. This type of storageset has the advantage of being highly reliable and extremely tolerant of device failure. Raid level 1 storagesets are referred to as mirrorsets.

RAID level 3
A RAID storageset that transfers data parallel across the array's disk drives a byte at a time, causing individual blocks of data to be spread over several disks serving as one enormous virtual disk. A separate redundant check disk for the entire array stores parity on a dedicated disk drive within the storageset. *See also* RAID level 5.

RAID level 3/5
A specially developed RAID storageset that stripes data and parity across three or more members in a disk array. A RAIDset combines the best characteristics of RAID level 3 and RAID level 5. A RAIDset is the best choice for most applications with small to medium I/O requests, unless the application is write intensive. A RAIDset is sometimes called parity RAID. Raid level 3/5 storagesets are referred to as RAIDsets.

RAID level 5
A RAID storageset that, unlike RAID level 3, stores the parity information across all of the disk drives within the storageset. *See also* RAID level 3.

RAIDset
See RAID level 3/5

read caching
A cache management method used to decrease the subsystem response time to a read request by allowing the controller to satisfy the request from the cache memory rather than from the disk drives.

read-ahead caching
A caching technique for improving performance of synchronous sequential reads by prefetching data from disk.

reconstruction
The process of regenerating the contents of a failed member's data. The reconstruct process writes the data to a spareset disk and then incorporates the spareset disk into the mirrorset, striped mirrorset, or RAIDset from which the failed member came. *See also* regeneration.

reduced
A term that indicates that a mirrorset or RAIDset is missing one member because the member has failed or is physically removed.

redundancy
The provision of multiple interchangeable components to perform a single function in order to cope with failures and errors. A RAIDset is considered to be redundant user data is recorded directly to one member and all of the other members include associated parity information.

regeneration
(1) The process of calculating missing data from redundant data. (2) The process of recreating a portion of the data from a failing or failed drive using the data and parity information from the other members within the storageset.

The regeneration of an entire RAIDset member is called reconstruction. *See also* reconstruction.

remote copy
A feature intended for disaster tolerance and replication of data from one storage subsystem or physical site to another subsystem or site. Remote copy also provides methods of performing a backup at either the local or remote site. With remote copy, user applications continue to run while data movement goes on in the background. Data warehousing, continuous computing, and enterprise applications all require remote copy capabilities.

remote copy set
A bound set of two units, one located locally and one located remotely for long distance mirroring. The units can be a single disk, or a storageset, mirrorset, or RAIDset. A unit on the local controller is designated as the "initiator" and a corresponding unit on the remote controller is designated as the "target." *See also* association set.

replacement policy
The policy specified by a switch with the SET FAILEDSET command indicating whether a failed disk from a mirrorset or RAIDset is to be automatically replaced with a disk from the spareset. The two switch choices are *AUTOSPARE* and *NOAUTOSPARE*.

request rate
The rate at which requests are arriving at a servicing entity.

RFI
Radio Frequency Interference. The disturbance of a signal by an unwanted radio signal or frequency.

SCSI
Small Computer System Interface. (1) An American National Standards Institute (ANSI) interface standard defining the physical and electrical parameters of a parallel I/O bus used to connect initiators to devices. (2) A processor-independent standard protocol for system-level interfacing between a computer and intelligent devices including hard drives, floppy disks, CD-ROMs, printers, scanners, and others.

SCSI bus signal converter
(1) A device used to interface between the subsystem and a peripheral device unable to be mounted directly into the SBB shelf of the subsystem. (2) A device used to connect a differential SCSI bus to a single-ended SCSI bus. (3) A device used to extend the length of a differential or single-ended SCSI bus.

Also called adapter. *See also* DWZZA, DWZZB, DWZZC, and I/O module.

SCSI device
(1) A host computer adapter, a peripheral controller, or an intelligent peripheral that can be attached to the SCSI bus. (2) Any physical unit that can communicate on a SCSI bus.

SCSI device ID number
A bit-significant representation of the SCSI address referring to one of the signal lines, numbered 0 through 7 for an 8-bit bus, or 0 through 15 for a 16-bit bus. *See also* target ID number.

SCSI ID number
The representation of the SCSI address that refers to one of the signal lines numbered 0 through 15.

SCSI port
(1) Software: The channel controlling communications to and from a specific SCSI bus in the system. (2) Hardware: The name of the logical socket at the back of the system unit to which a SCSI device is connected.

SCSI-A cable
A 50-conductor (25 twisted-pair) cable generally used for single-ended, SCSI-bus connections.

SCSI-P cable
A 68-conductor (34 twisted-pair) cable generally used for differential bus connections.

selective storage presentation
Selective Storage presentation is a feature of the HSG80 controller that enables the user to control the allocation of storage space and shared access to storage across multiple hosts. This is also known as “Restricting Host Access.”

serial transmission
A method transmission in which each bit of information is sent sequentially on a single channel rather than simultaneously as in parallel transmission.

service rate
The rate at which an entity is able to service requests. For example, the rate at which an Arbitrated Loop is able to service arbitrated requests.

signal converter
See SCSI bus signal converter

single ended I/O module
A 16-bit I/O module. *See also* I/O module.

single-ended
SCSI bus
An electrical connection where one wire carries the signal and another wire or shield is connected to electrical ground. Each signal logic level is determined by the voltage of a single wire in relation to ground. This is in contrast to a differential connection where the second wire carries an inverted signal.

spareset
A collection of disk drives used by the controller to replace failed members of a storageset.

star coupler
The physical hub of the CI cluster subsystem cabling. The star coupler is a set of connection panels contained within a cabinet containing cable connections and transformers through which the nodes of a cluster connect to one another through the CI bus. *See also* node and CI bus.

storage array
An integrated set of storage devices.

storage array subsystem
See storage subsystem

storage subsystem
The controllers, storage devices, shelves, cables, and power supplies used to form a mass storage subsystem.

storage unit
The general term that refers to storagesets, single-disk units, and all other storage devices that are installed in your subsystem and accessed by the host. A storage unit can be any entity that is capable of storing data, whether it is a physical device or a group of physical devices. *See also* container.

storageset
(1) A group of devices configured with RAID techniques to operate as a single container.
(2) Any collection of containers, such as stripesets, mirrorsets, striped mirrorsets, and RAIDsets.

storageset expansion
The dynamic expansion of the storage capacity (size) of a unit. A storage container is created in the form of a concatenation set which is added to the existing storage set defined as a unit.

stripe
The data divided into blocks and written across two or more member disks in an array.

stripe size
The stripe capacity as determined by n–1 times the chunksize, where n is the number of RAIDset members.

striped mirrorset
See RAID level 0+1

stripeset
See RAID level 0

striping
The technique used to divide data into segments, also called chunks. The segments are striped, or distributed, across members of the stripeset. This technique helps to distribute hot spots across the array of physical devices to prevent hot spots and hot disks.

Each stripeset member receives an equal share of the I/O request load, improving performance.

surviving controller
The controller in a dual-redundant configuration pair that serves its companion's devices the companion controller fails.

switch
A method that controls the flow of functions and operations in software.

synchronous
Pertaining to a method of data transmission which allows each event to operate in relation to a timing signal. *See also* asynchronous.

tape
A storage device supporting sequential access to variable sized data records.

target
(1) A SCSI device that performs an operation requested by an initiator. (2) Designates the target identification (ID) number of the device.

target ID number
The address a bus initiator uses to connect with a bus target. Each bus target is assigned a unique target address.

this controller
The controller that is serving your current CLI session through a local or remote terminal. *See also* other controller.

TILX
Tape inline exerciser. The controller diagnostic software to test the data transfer capabilities of tape drives in a way that simulates a high level of user activity.

topology
An interconnection scheme that allows multiple Fibre Channel ports to communicate with each other. For example, point-to-point, Arbitrated Loop, and switched fabric are all Fibre Channel topologies.

transfer data rate
The speed at which data can be exchanged with the central processor, expressed in thousands of bytes per second.

transparent failover
Keeps the storage array available to the host(s) by allowing the surviving controller of a dual redundant pair to take over total control of the subsystem and is transparent (invisible) to the host(s).

ULP
Upper Layer Protocol.

ULP process
A function executing within a Fibre Channel node which conforms to the ULP requirements interacting with other ULP processes.

Ultra SCSI bus
A Fast-20 SCSI bus. *See also* Wide Ultra SCSI.

uninterruptible power supply
See UPS

unit
A container made accessible to a host. A unit can be created from a single disk drive. A unit can also be created from a more complex container such as a RAIDset. *See also* target; target ID number.

unwritten cached data
Sometimes called unflushed data. *See also* dirty data.

UPS
Uninterruptible power supply. A battery-powered power supply guaranteed to provide power to an electrical device in the event of an unexpected interruption to the primary power supply. Uninterruptible power supplies are usually rated by the amount of voltage supplied and the length of time the voltage is supplied.

VHDCI
Very High-Density-Cable Interface. A 68-pin interface that is required for Ultra SCSI connections.

virtual terminal
A software path from an operator terminal on the host to the controller CLI, sometimes called a host console. The path can be established via the host port on the controller or via the maintenance port through an intermediary host. *See also* maintenance terminal.

VTDPY
Virtual terminal display. A utility that allows viewing of specific informational displays using CLI commands.

wide Ultra SCSI
Fast-20 on a Wide SCSI bus.

World Wide Name
A unique 64-bit number assigned to a subsystem by the Institute of Electrical and Electronics Engineers (IEEE) and set by DIGITAL manufacturing before shipping. *Also called* node ID within the CLI.

write hole
The period of time in a RAID level 1 or RAID level 5 write operation an opportunity emerges for undetectable RAIDset data corruption. Write holes occur under conditions such as power outages, where the writing of multiple members can be abruptly interrupted. A battery backed-up cache design eliminates the write hole because data is preserved in cache and unsuccessful write operations can be retried.

writeback caching
A cache management method used to decrease the subsystem's response time to write requests by allowing the controller to declare the write operation "complete" as soon as the data reaches its cache memory. The controller performs the slower operation of writing the data to the disk drives at a later time.

write-through cache
A cache management technique for retaining host write requests in read cache. the host requests a write operation, the controller writes data directly to the storage device. This technique allows the controller to complete some read requests from the cache, greatly improving the response time to retrieve data. The operation is complete only after the data to be written is received by the target storage device.

This cache management method can update, invalidate, or delete data from the cache memory accordingly, to ensure that the cache contains the most current data.

write-through caching
A cache management method used to decrease the subsystem's response time to a read. This method allows the controller to satisfy the request from the cache memory rather than from the disk drives.

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